ENGINEERING NEWS-RECORD

The AIA Centennial –

Progress in Buildings

- **HOW** thin will walls get?
- **HOW** should you build for automation?
- **WHAT** type of design organization is best?
- **HOW** mechanical will homes become?

An ENR Staff Report — page 33

A McGRAW-HILL PUBLICATION

ANN ARBOR MICH
313 N 1 ST
UNIVERSITY MICROFILMS IN
E R POWER GS

OASIS...
on the KANSAS TURNPIKE

Six 40,000-gal. Horton Waterspheres welcome turnpike travelers to food and motor supplies along the 236 mile route at: Topeka, Emporia, Lawrence, El Dorado, Matfield Green, and Wellington, Kansas.

SIX HORTON WATERSPHERES
Landmark $160 Million Toll Road Project

Opening a new modern route to the Southwest, the Kansas Turnpike passes through 236 miles of the most densely . . . and the most sparsely, populated sections of Kansas.

Six Horton Waterspheres® beckon pike travelers, from a distance, to service areas spaced at 45 mile intervals along the route. Their pleasing symmetry typifies the careful blending of beauty, safety and utility which has marked the commission's planning for this project.

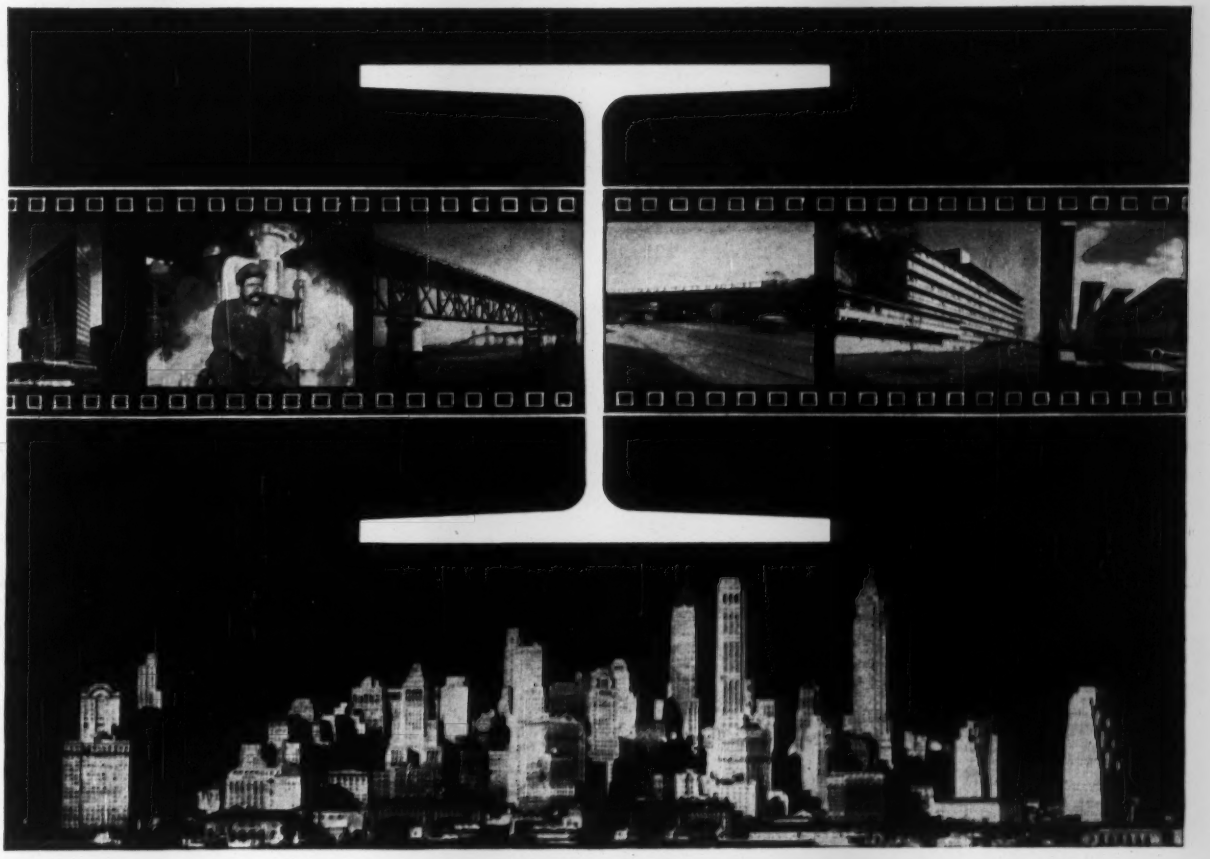
Waterspheres are all-welded structures which require little maintenance and a minimum of ground area for foundations. The base may be utilized for pumping equipment or storage. Built in capacities to 250,000 gallons, Waterspheres provide dependable gravity pressure water storage for general service. Write your nearest CB&I office for details.

CBI

Chicago Bridge & Iron Company

Atlanta • Birmingham • Boston • Chicago • Cleveland • Detroit • Houston
New Orleans • New York • Philadelphia • Pittsburgh • Salt Lake City
San Francisco • Seattle • South Pasadena • Tulsa
Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA
REPRESENTATIVES AND LICENSEES
Australia, Cuba, England, France, Germany, Italy, Japan, Netherlands, Scotland

E-48CB



New Film Tells Story of Steel and the Nation's Skyline

A new Bethlehem motion picture, *Skylines*, is now available for showing.

Skylines is a 29-minute sound-and-color film that dramatically portrays the role of structural steel in building the skylines of today.

The picture tells how large multistory buildings were not practical until builders gave up the compression structure and began working with steel framework.

Structural steel was given new dimensions when Charles M. Schwab, Bethlehem Steel's founder, built the country's first mill to roll wide-flange structural shapes, at Bethlehem, Pa. These wide-flange shapes led the way into the age of skyscrapers.

But skyscrapers are only a part of the story of *Skylines*. There are bridges, too—from giants like the Golden Gate and Chesapeake Bay to the thousands of railway and highway bridges all over the country.

And there is the story of today's bold new concepts in building—modern shopping centers, industrial buildings, hospitals, apartments and schools.

FREE ON REQUEST—There is no charge for the use of this 16-mm film. We suggest that prints be ordered at least three weeks in advance of your desired showing date, to allow ample time for scheduling and shipping. Please fill out the coupon below and mail it to Publications Department, Bethlehem Steel Company, Bethlehem, Pa.

PUBLICATIONS DEPARTMENT
BETHLEHEM STEEL COMPANY
BETHLEHEM, PA

Gentlemen:
Please send me a print of your new film, "Skylines." I will return it promptly, paying return postage.

Approximate date wanted_____

Send print to_____

_____

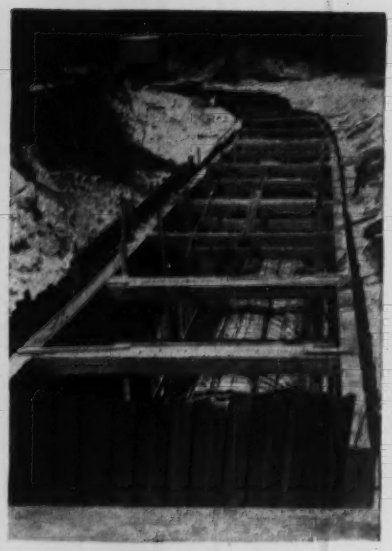
Name of organization _____

_____

Signature_____

BETHLEHEM STEEL

BETHLEHEM STEEL



FOSTER LIGHTWEIGHT PILING

the best, low-cost protection for light load excavation

This is the most economical sheeting available for lighter excavation jobs. Foster Lightweight Piling offers the greatest strength, pound for pound, of any other lightweight piling, handles by hand, drives with an airhammer, requires no special rig or tools. Rigid box-type corrugation gives easier driving and recovery, lets you work faster. Special interlock design won't jam, permits the simple locking of sheets together without sliding one into the other the entire length. Higher section modulus permits using a lighter gauge with less bracing—*assures lower costs* on any job. Immediate deliveries in any length, in any quantity from Foster warehouse stocks—Rental or Sale. Investigate these special advantages. Write for catalogs and quotations on your next job.

STEEL-SHEET PILING • PIPE-FOR-PILING
H-BEARING PILE • RAIL PILE
PIPE • RAILS • TRACK EQUIPMENT

L.B. FOSTER CO.
PITTSBURGH 30 • NEW YORK 7 • CHICAGO 4
ATLANTA 8 • HOUSTON 2 • LOS ANGELES 5

ENGINEERING NEWS-RECORD

EIGHTY-THIRD YEAR OF PUBLICATION

MEMBER

Editorial Offices, 330 W. 42nd St., New York 36, N. Y.
New York - LOngacre 4-3000; Chicago - MOhawk 4-5800; San Francisco - DOuglas 2-4600; Washington - REpublic 7-6630

Waldo G. Bowman, Editor

Highways, Airports—Transportation

Eugene E. Haimes, Jr., *Senior Editor*
Edward M. Young, Jr., Joseph N. Todaro

Buildings, Bridges—Structures

Frederick S. Merritt, *Senior Editor*
James B. Sullivan, John P. Mahoney

Rivers, Sanitation—Water Use

Arthur J. Fox, Jr., *Senior Editor*
Howard Jacoby, Marc Leggiero

Finance, Labor—Management

Clyde C. Henning, *Associate Editor*
Charles J. Harding

Regional Editors

J. Roland Carr, *Chicago, 520 N. Michigan Ave.*
Lauress L. Wise, *San Francisco, 68 Post St.*

Copy, Presentation—Production

Stanley C. Jensen
Barbara Lamb
Harry W. Jensen, *Presentation*
Katherine A. Lacy, *Makeup*
John C. Greenough, *Printing*

Statistics, Prices, Costs—Business News

Elsie Eaves, *Manager*
Julia Mahoney, *Construction Reports*
Mildred Wetzel
Marion Sciorra, Florence Dembek
James Webber, *Economics*
Ruth I. Carlson, Marie Roessler, Evelyn Huber
Ingeborg von Zitzewitz, *Unit Prices*

Editorial Research and Indexing

Helen Rich
Eva Glerat, Rene Hay, Patricia Witschger
Marianne Stern, Ruth Solomon, Marie Bellon

Consulting Editors: **Van Tuyl Boughton**, *New York*
Nathan A. Bowers, *San Francisco*

Washington Bureau, National Press Bldg., Washington 4, D. C., George B. Bryant, Jr., Chief, Alan E. Adams, Glen R. Bayless, Roy Calvin, Ernest Conine, John C. L. Donaldson, Jay Flocken, Boyd France, Sam J. Justice, Arthur J. Kraft, Donald O. Loomis, Gladys Montgomery, Arthur L. Moore, Seth T. Payne, Morton A. Reichek, V. Craig Richter, Caroline W. Robertson, Vincent B. Smith.

Domestic News Bureaus: Cleveland—1510 Hanna Bldg., Cleveland 15, William G. Meldrum, Michelle M. Perry; **Detroit**—856 Penobscot Bldg., Detroit 26, Harry Homewood, Chief; **Pacific Coast**—68 Post Street, San Francisco 4—Margaret Ralston, Chief, Jenness Keene, Sue Johnson, 1125 West 6th Ave., Los Angeles 17—John K. Shinn, Michael J. Murphy; **Seattle**—6040 Fifth Ave., N. E., Ray Bloomberg; **Southeastern**—801 Rhodes-Haverty Bldg., Atlanta 3, Charles T. Dixon, Jr., Chief, Frances Ridgway; **Southwestern**—901 Vaughn Bldg., Dallas, Kemp Anderson, Jr., Chief, Lorraine Smith.

Foreign News Bureaus: New York—John Wilhelm, Editor; **London**—William J. Coughlin; **Paris**—Robert E. Farrell; **Rio de Janeiro**—Peter Weaver; **Mexico City**—Jack Kearney; **Bonn**—Morrie Helitzer; **Beirut**—O. M. Marashian; **Tokyo**—Dan Kurzman; **Melbourne**—Alicja Grobtuch. Correspondents in 56 cities throughout the world.

Correspondents: In 77 principal cities in the U.S. and possessions and the Dominion of Canada.

McGraw-Hill Economics Department: Dexter M. Keezer, director; W. H. Chartener

Robert F. Boger, Publisher

ENGINEERING NEWS-RECORD, Vol. 158, No. 21, MAY 23, 1957

Published weekly by McGraw-Hill Publishing Company, James H. McGraw (1860-1948), Founder. Publication Office, 99-129 North Broadway, Albany 1, N. Y. See panel below for directions regarding subscriptions or change of address. **Executive, Editorial, Advertising and Circulation Offices. McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y.** Donald C. McGraw, President; Joseph A. Gerardi, Executive Vice President and Treasurer; John J. Cooke, Secretary; Nelson Bond, Executive Vice President, Publications Division; Ralph B. Smith, Vice President and Editorial Director; Joseph H. Allen, Vice President and Director of Advertising Sales; A. R. Venezian, Vice President and Circulation Coordinator. **Subscriptions are solicited only from persons with identifiable commercial or professional interest in construction and building. Position and company connection must be indicated on unsubscribed orders.** United States subscription rate for individuals in the field of this publication $6.00 per year, single copies 50 cents; foreign $20.00 per year, payable in advance. Second-Class mail privileges authorized at Albany, New York. Printed in U.S.A. Title registered in U.S. Patent Office. © Copyrighted 1957 McGraw-Hill Publishing Company, Inc. All Rights Reserved.

SUBSCRIPTIONS: Send subscription correspondence and change of address to Subscription Manager, ENGINEERING NEWS-RECORD, 330 W. 42nd St., New York 36, N. Y. Subscribers should notify publisher promptly of any change of address, giving old as well as new address, and including postal zone number, if any. If possible, enclose an address label from a recent issue of the magazine. Please allow one month for change to become effective.

Postmaster: Please send Form 3579 to Engineering News-Record, 330W. 42nd St., New York 36, N. Y.

YOU "PLAY SAFE" 3-WAYS with...

PROJECT: Storm Sewers for City of Akron, Ohio.

ENGINEERS: H. E. Watson, City Engineer, and E. D. Barstow & Associates, Consulting Engineers. H. W. McCutcheon, Project Engineer.

CONTRACTOR: Shullo Construction Co., Akron, Ohio.

PIPE: 84" reinforced Standard and Extra-Strength UNITED STATES Concrete Culvert Pipe, manufactured at Palmyra, Ohio.

UNITED STATES
CONCRETE PIPE

1 **PROMPT DELIVERY** — Five conveniently located concrete pipe plants and sales offices — the most recent in Ft. Lauderdale, Florida — assure quick deliveries right to the job site, helping to keep your projects on schedule.

2 **COMPLETE LINE** — We furnish Concrete Sewer and Culvert Pipe from 6" to 108", Fittings, Vitrified Clay Plate-Lined Pipe, pre-cast Manholes and TYLOX Flexible Couplings. You can be sure of meeting your **entire** pipe requirements at one source when you plan on UNITED STATES Concrete Pipe.

3 **PRODUCT QUALITY** — Nearly half a century of pipe-making experience, combined with modern production methods and machinery, assures highest **uniform** quality in our products. Arrange now for UNITED STATES pipe on your next concrete pipe job, and "play safe" three ways.

6039

UNITED STATES CONCRETE PIPE CO.
UNIVERSAL SEWER PIPE CORPORATION

PRODUCTS

Vitrified Clay Pipe with Tylox Flexible Couplings, Vitrified Clay Liner Plates, Ship Lap Wall Coping and other Clay Products, Concrete Pipe.

SALES OFFICES

Baltimore 27, Md.—Halethorpe Branch, Box 7428	Tel. EL-877
Philadelphia, Pa.	Tel. EN-6015
P. O. Box 30, Bristol, Pa.	Tel. ST-8-5571
Cincinnati, Ohio—P. O. Newtown, Ohio, Box 215	Tel. LO-1-7846
Ft. Lauderdale, Fla.—P. O. Box 958	Tel. JA-4-8461

GENERAL OFFICES • 1500 Union Commerce Bldg. • Cleveland 14, Ohio • Tel. Main 1-5240

FRUEHAUF TRAILERS

"ENGINEERED TRANSPORTATION"

World's Largest Builder of Truck-Trailers

FRUEHAUF TRAILER COMPANY

10955 Harper Avenue • Detroit 32, Michigan

✓ **PLEASE SEND THE FREE LITERATURE ON FRUEHAUF CONSTRUCTION TRAILERS AT ONCE!**

NAME_____

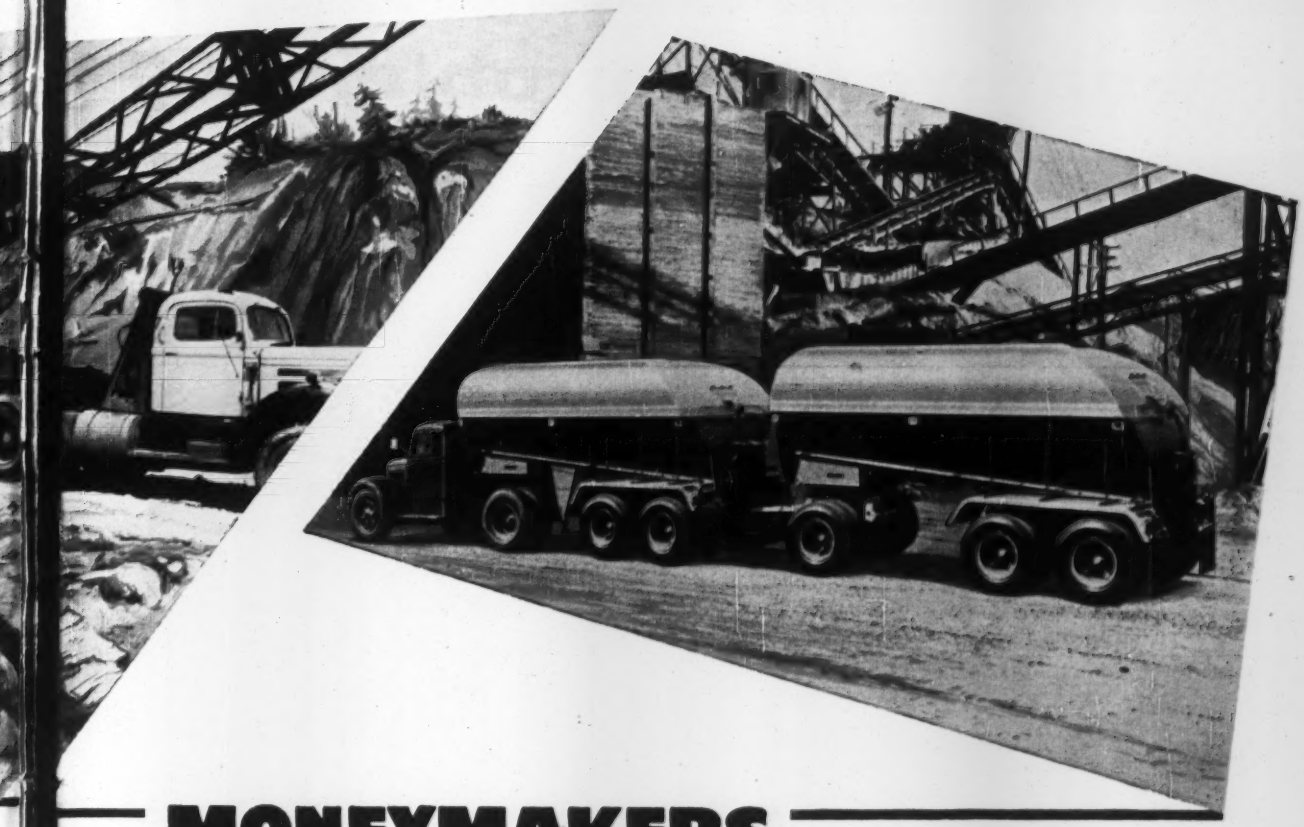
COMPANY_____

ADDRESS_____

CITY_____ STATE_____

☆ *Fill in or just attach to letterhead and mail.*

THE EFFICIENCY OF YOUR



MONEYMAKERS

All roadbuilding contractors should be aware of the sizeable economies now made possible by innovations in roadbuilding Trailers in the complete Fruehauf line.

The new *Winchless Removable Gooseneck Carryall,* for instance, cuts front end unloading of heavy cranes and shovels to less than 15 minutes. The moneymaking *Fruehauf-Schonrock Cable Dump,* economical in cost and maintenance, delivers up to 4,000 lbs. more sand or gravel than conventional dumps, and is simple in design and operation. The *Airslide* Bulk Cement Transport* unloads cement or other pulverized materials at the rapid rate of 10 to 15 barrels per minute — with no mechanical device touching the commodity.

These provisions for speed, simplicity, and operating economy add up to increased profits every day, right now, for roadbuilding contractors. Send for illustrated literature!

*Trademark—Fuller Co.

FRUEHAUF FLEET IS PART OF YOUR ROADBUILDING PROFIT!

whatever the problem . . .

Two things you're sure of when you use cast iron pipe. It will do the job. It will last.

Proved in *water* service . . . for fire protection, feeder and distribution mains, purification plants.

Proved in *gas* service . . . for feeder and distribution mains.

Proved in *sewerage* systems . . . for force mains, outfalls, treatment plants.

Engineers everywhere are familiar with cast iron pipe's outstanding record. They specify it because it's versatile . . . because its rugged strength has served for centuries. And, today, *modernized* cast iron pipe, centrifugally cast, is even stronger, more durable.

For information, write: Cast Iron Pipe Research Association, Thomas F. Wolfe, Managing Director, Suite 3440, Prudential Plaza, Chicago 1, Illinois.

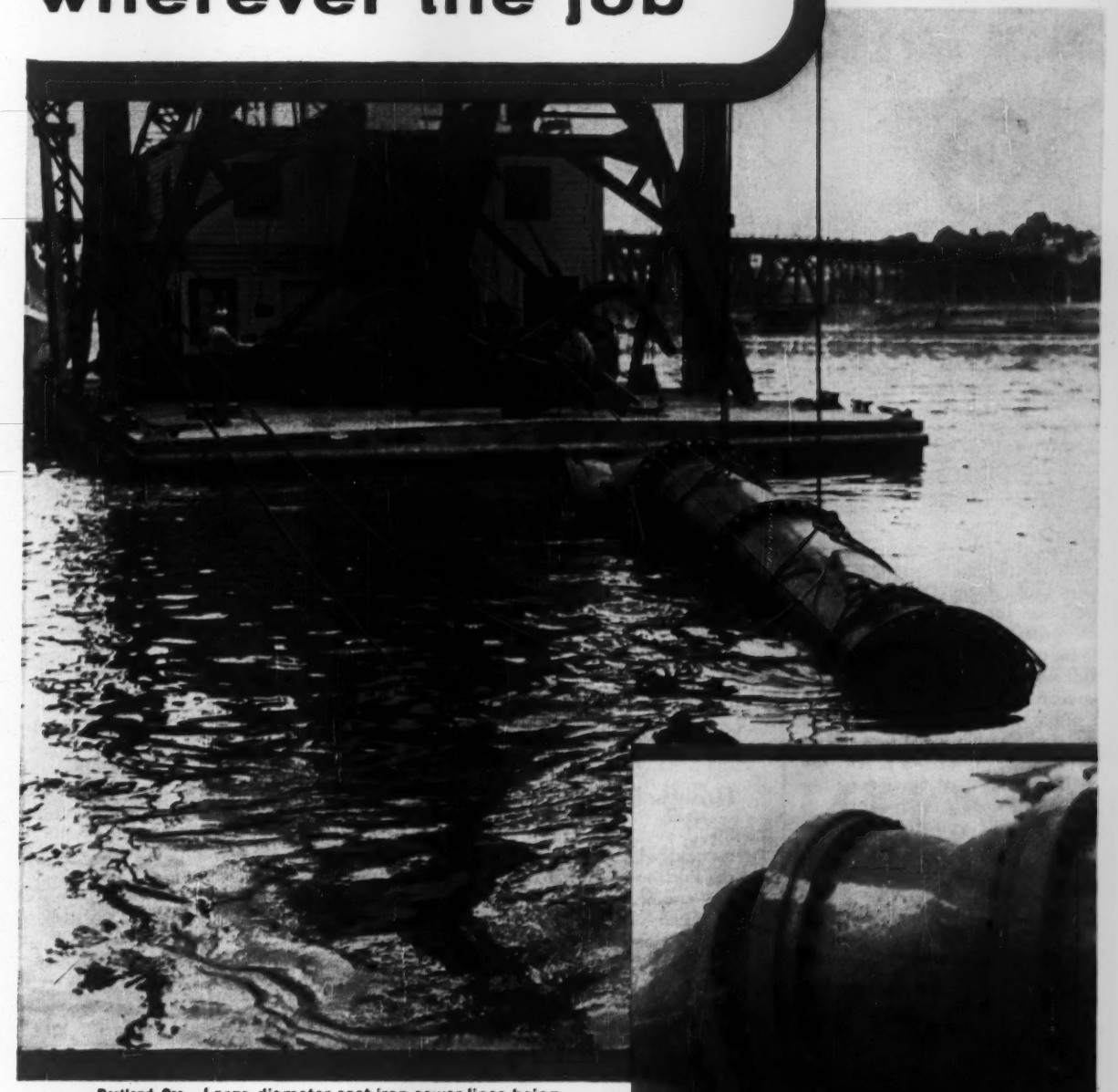
Brooklyn, N. Y.—Laying 42" Mechanical Joint cast iron pipe for gas main.

CAST IRON

Cast Iron Pipe Research Association, Thos. F. Wolfe, Managing Director, Suite 3440, Prudential Plaza, Chicago 1, Ill.

CAST IRON PIPE

wherever the job



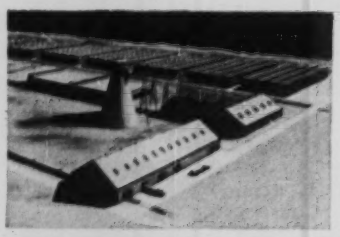
Portland, Ore.—Large diameter cast iron sewer lines being installed across Willamette River, part of program to restore normal river conditions for salmon spawning.

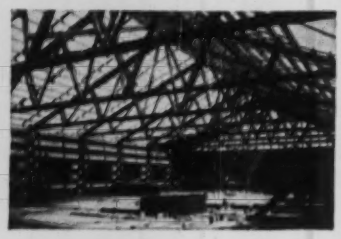
St. Louis County, Mo.—36" cast iron intake line at the North County Water Plant of the St. Louis County Water Company.

SERVES FOR CENTURIES...

A Winning Case

FOR TIMBER—ENGINEERED BY TECO





Thirty-four 70-foot span Belgian roof trusses were used by the Olin Mathieson Chemical Corporation for 45,500 square feet of post-free working area in their new Frostbrand Hardwood flooring plant in Shreveport, Louisiana.

Teco roof trusses with 4" Wedge-Fit split rings were built at a savings of 43% of the estimated cost of steel framing.

Design data are available to you for jobs you are planning. Let us know your requirements.

Send for your FREE copies of "Typical Lumber Designs" and "Teco Design Manual for Timber Connector Construction."

TIMBER ENGINEERING CO. ENR-575
1319 18th Street, N.W.
Washington 6, D. C.

Please send Free copies of the "Teco Design Manual for Timber Connector Construction" and "Typical Lumber Designs."

Name.....

Firm.....

Street.....

City, Zone, State.....

Reader Comment

Anti Anti-Pirating

SIR—Apparently the Bureau of Public Roads and its supporters, through the proposed "anti-pirating" clause (ENR April 25, p. 25) are attempting not only to aggravate the existing shortage of engineers but also ensure the eventual unionization of highway engineers. The obvious effect of controlling the market for highway engineers (or any other group) is to ensure a level of apathetic mediocrity throughout this already under-paid field.

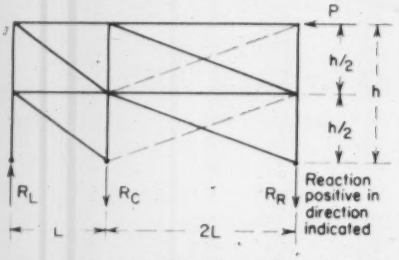
Sooner or later the highway engineers will likely want the economic advantages of unionization if they are to be subjected to mass-oriented personnel policies anyhow. Then the air will be rent with the cries of hypocrites who support the "anti-pirating" clause lamenting the further decline of "rugged-individualism."

My commendations to the National Society of Professional Engineers and others who oppose this unfair and unnecessary regimentation of engineers. A government that can afford to pay a rock-and-roll band leader $2,000 a week on his trip through the Far East does not have to limit the legitimate economic gains of its more productive citizens.

C. W. GRIFFIN
Erlton, N. J.

How is Shear Distributed?

SIR, I have been struck by the various methods of distribution utilized in carrying horizontal shear to the ground, and the varying results that can thereby be obtained, especially with regard to vertical column loads. I offer the following example:



Method 1—Equal Shear Distribution. In accordance with this assumption, place $P/2$ on each frame. Then:

$$R_L = \frac{P\,h}{2\,L}$$

$$R_R = R_C = \frac{P\,h}{4\,L}$$

That is, R_L is under compressive loading, and both R_R and R_C must resist the overturning of P with tensile reactions.

This raises a question. Can shear be equally distributed among bents when some bents may be two, three, or even four times as wide as others?

Method 2—Distribution proportional to width.

Another assumption would be that the wider the bay, the more rigid it is, and therefore less likely to deflect. Therefore, the wider bay is assumed to carry more shear than the narrow one. Some designers proportion the shear to the width of the bay. To make this assumption in our particular case is to place $P/3$ on the left bent, and $2\,P/3$ on the right bent.
Then:

$$R_L = R_R = \frac{1\,Ph}{3\,L}$$

$$R_C = 0$$

Both Methods I & 2 would be the same were the bays of equal width, but now that the widths differ, so do the results, both in magnitude of R_L and R_R, and in the vexing question of whether any load exists at all on column R_C.

Method 3—Geometric Moment of Inertia of Bent.

This method, while not too applicable here, has been used where the two bays are separated by an unbraced bent, and is akin to considering the bents as beams, with columns becoming flanges of area equal to unity.

In this method $4P/5$ would be placed on one bent, say the right, and $P/5$ on the other. Then:

$$R_L = \frac{Ph}{5L}$$

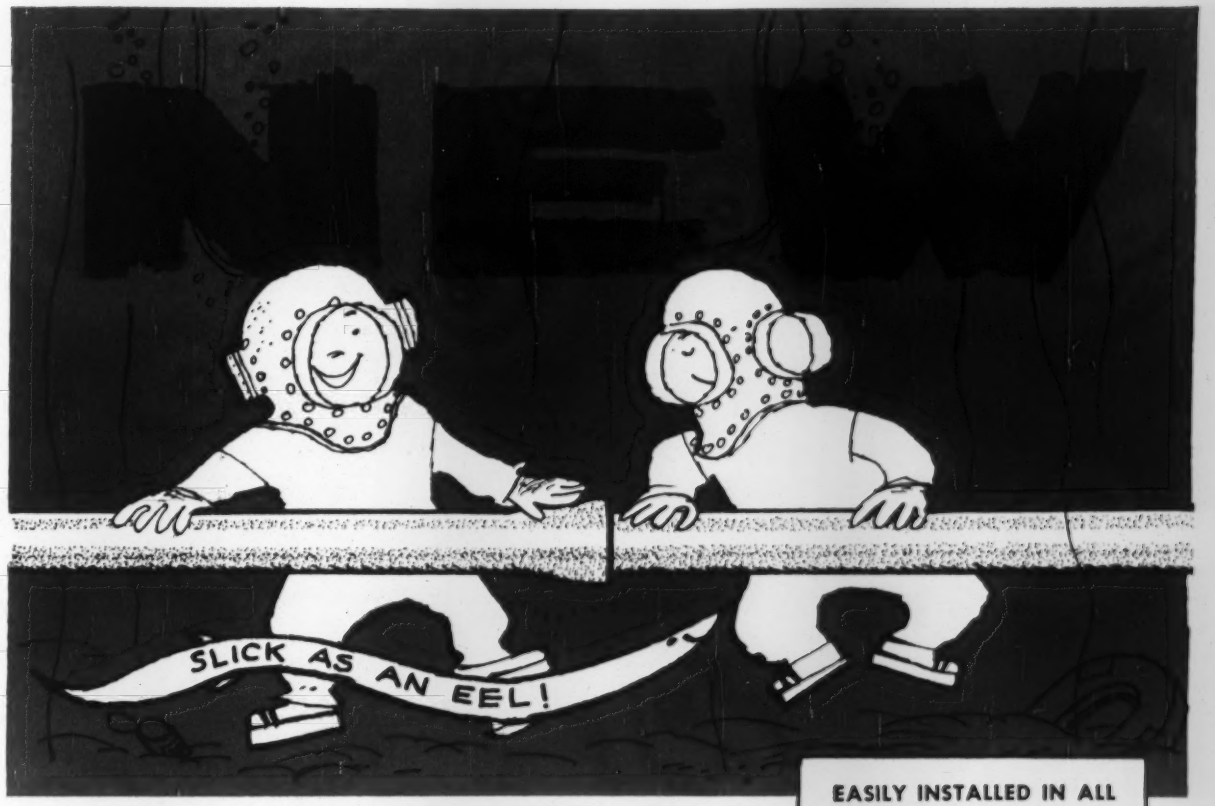
$$R_C = -\frac{Ph}{5L}$$

$$R_R = \frac{2\,Ph}{5L}$$

In this case, which has become the

Engineering News-Record welcomes expression of opinion from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance.

Letters should be addressed: Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.



EASILY INSTALLED IN ALL KINDS OF WEATHER . . . YOU COULD EVEN DO IT UNDER WATER!

CLOW

SLIP-ON PIPE JOINT*

forms bottle-tight joint instantly!

Saves you so much time you'll think the clock is paralyzed. Yet assembly is simple and easy, and you get a seal that's tight as a drum. Best of all, you get Clow Cast Iron Pipe . . . for the watermain installation that is economical and permanent.

Want more details? You should have them. There's a Clow man not too far from you right now . . . ready to give you all the facts. Phone us—or drop us a note.

**Patent applied for*

EASY AS "A-B-C"!

A INSERT GASKET IN BELL.

B WIPE ON LUBRICANT.

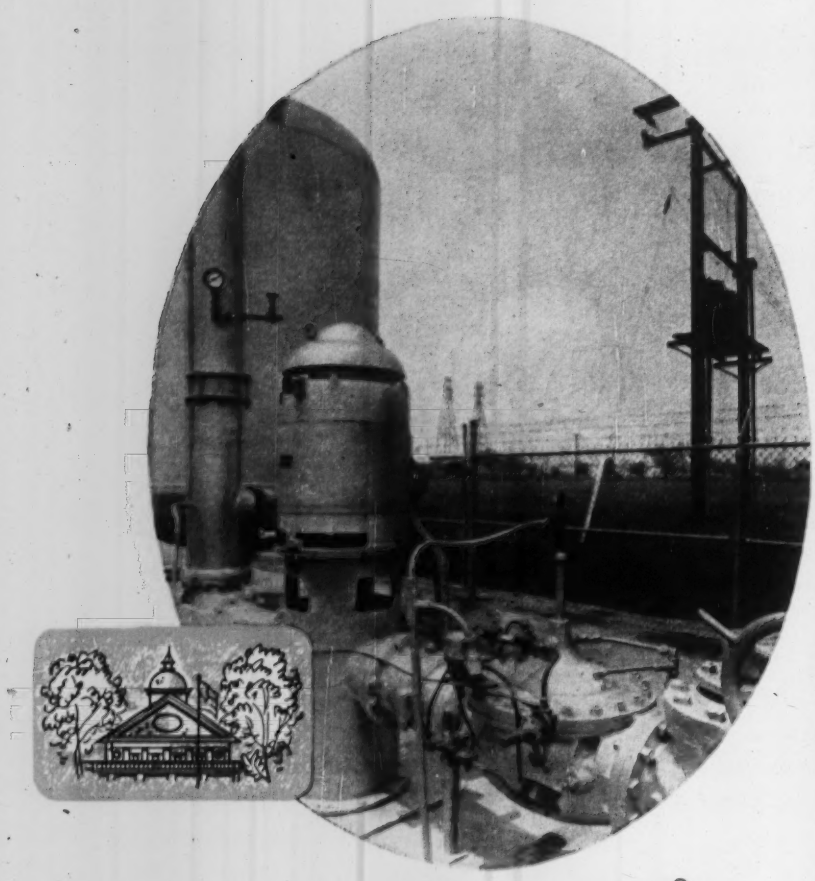
C SLIP PLAIN END INTO BELL.

SINCE 1878

JAMES B. CLOW & SONS, Inc.

201-299 North Talman Avenue, Chicago 80, Illinois

Subsidiaries:
Eddy Valve Company, Waterford, New York
Iowa Valve Company, Oskaloosa, Iowa



Verti-Line®

BOOSTER PUMPS

In

WATER SYSTEM

This Suction-Cased Booster Pump is one of two Verti-Line units maintaining pressure in a large water system.

It is a 60 HP pump, handling 1,000 GPM against 170 feet head. Installed in August 1953, it has proven highly satisfactory in performance – and has cut maintenance expense to the bone.

Over 100,000 satisfied vertical pump users agree there's no pump like Verti-Line for low first cost, economical operation, and negligible maintenance.

Send for new brochure, "PUMPS FOR SALE". Ask for Bulletin 57

IF YOUR NEEDS INCLUDE BOOSTER PUMPS, IT WILL PAY YOU TO INVESTIGATE VERTI-LINE BEFORE YOU BUY.

Verti-Line Pumps are exclusive products of

LAYNE & BOWLER PUMP COMPANY
general offices & main plant
2943 VAIL AVENUE • LOS ANGELES 22, CALIFORNIA

. . . Reader Comment

opposite of Method 1, R_C has reversed in direction, becoming compressive, and R_R is the sole tensile member. The changes in magnitude and emphasis of R_L & R_R are significant, also.

Method 4—Area of Diagonal Section. This method has been used by some European designers in this country, who select their bracing members first, usually based on L/r. They then find the horizontal projection of the cross-sectional area, which is equivalent to multiplying the diagonal area by the cosine of the angle made by the brace with the horizontal, and distributing the shear on this basis. The contention is that the horizontal projection of the cross-sectional area represents the ability of the bracing member to take horizontal load. This can give you varying amounts of shear, but in this case, will not be very far from a 50-50 distribution.

Other methods may be devised for distributing the shear, taking into account areas of columns and members, moments of inertia of column groups, etc. Is one method more nearly correct than any of the others? Or are there two, or even more methods, each one of which is particularly applicable under certain conditions?

I will be grateful to discover which of the methods presented seems to have the general backing of the engineering profession.

MURRAY RUBIN
Structural Department
Koppers Co. Inc.
Pittsburgh, Pa.

CALENDAR

American Institute of Steel Construction, Ninth Annual Engineering Conference, Edgewater Beach Hotel, Chicago, Ill., May 27-28.

National Conference on Co-ordinating Metropolitan Area Transportation, Bismarck Hotel, Chicago, Ill., May 27-28.

Air Pollution Control Association, golden jubilee meeting, St. Louis, Mo., June 2-6.

American Society of Civil Engineers, spring convention, Hotel Statler, Buffalo, N. Y., June 3-7.

Annual Meeting of American Society for Testing Materials, Chalfonte-Haddon Hall, Atlantic City, N. J., June 16-21.

Wire Reinforcement Institute, Inc., annual spring meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., June 24-25.

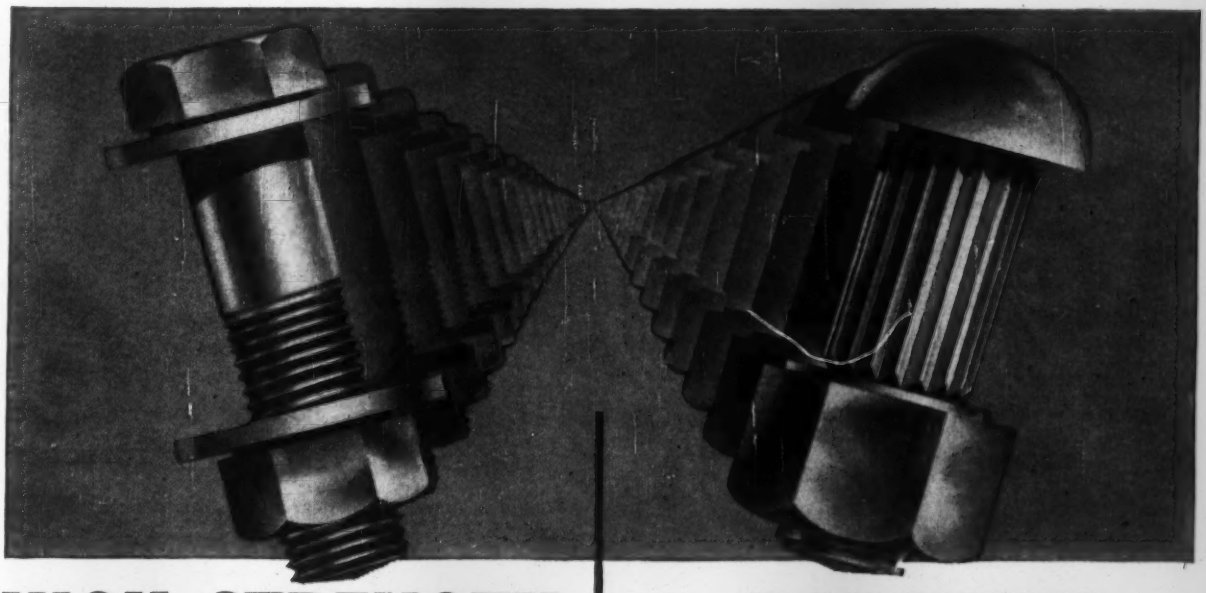
Concrete Reinforcing Steel Institute, annual meeting, The Greenbrier, White Sulphur Springs, W. Va., June 24-29.

World Conference on Prestressed Concrete, Fairmont Hotel, San Francisco, Calif., July 29-August 2.

Hydraulics Conference, ASCE Hydraulics Division, Massachusetts Institute of Technology, Cambridge, Mass., Aug. 26-28.

All sizes in stock

To help you make stronger and faster structural steel field connections!



HIGH STRENGTH STEEL BOLTS

(To specification ASTM-A-325)

High strength steel bolts are replacing hot-driven rivets on almost all applications. Their tensile strength is from 90,000 to 125,000 psi, depending on diameter, as against 52,000 to 62,000 psi for rivets. High strength bolts can be installed by one or two men with wrenches, while hot-driven rivets demand four men and cumbersome equipment. Connections made with high strength bolts do not have to be pre-fitted. High strength bolts are safer and easier to handle and eliminate the hazard of fire which is always present when red-hot rivets are used.

Mil-Carb carburized washers are available from stock in all sizes.

DARDELET RIVET BOLTS

The Dardelet Rivet Bolt is a rivet and bolt in a single fastener. It has a rivet-type head, an axially ribbed shank, and a Dardelet locking thread to which a Dardelet nut is fitted. When driven into a hole, the ribs grip the joined members as no other fastener can. Dardelet Rivet Bolts are installed by only one or two men, driven and wrench-tightened. The use of Dardelet Rivet Bolts for structural steel connection is approved by the American Institute of Steel Construction, by the U. S. Navy's Bureau of Yards and Docks, and state and municipal building authorities.

For more detailed information, see our 12 page section in Sweets Catalog, or contact our Chicago Office.

U. S. STEEL SUPPLY

DIVISION

P. O. Box 1099, Chicago 90, Ill.

General Offices:
208 So. La Salle St., Chicago 4, Ill.

Warehouses and Sales Offices Coast to Coast

UNITED STATES STEEL

90% of the 15,000-mile Pan American Highway will be asphalt surfaced.

95% of the asphalt plant mix is produced or paved by Barber-Greene Asphalt Plants and Finishers.

Write for literature on the world's pace-setting road building equipment.

57-11-F

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

Outshines them all

DIETZ Visi-flash TRADE-MARK **HAZARD WARNING LIGHTS**
(TRANSISTORIZED)

. . . Proved performance wins praise everywhere

"Brighter . . . tougher . . . low-cost . . . trouble free!" These are but a few of the enthusiastic quotes from contractors, municipal, county and state officials, utility and industrial users in commenting on new transistorized Dietz Visi-Flash Hazard Warning Lights.

- **The transistor circuit makes it shock-proof, uses minimum current, won't wear out . . . eliminates common maintenance problems.**
- **Optical lenses, longer dwell time, and "white" bulb make Visi-flash up to 40% brighter.**
- **First cost is 15% to 25% less than ordinary flashers.**

Go **DIETZ** *and you go Safely*

In actual field tests, made at 800 and 2,000 yards, Dietz Visi-flash proved the brightest, and most visible in all types of weather.

No wonder everyone is saying: "This is the hazard warning flasher we've been waiting for!"

You'll be saying the same thing when you use Dietz Visi-flash Hazard Warning Lights. 4 styles available. See your Dietz distributor, or use coupon for free catalog. Mail to R. E. DIETZ COMPANY, SYRACUSE, N. Y.

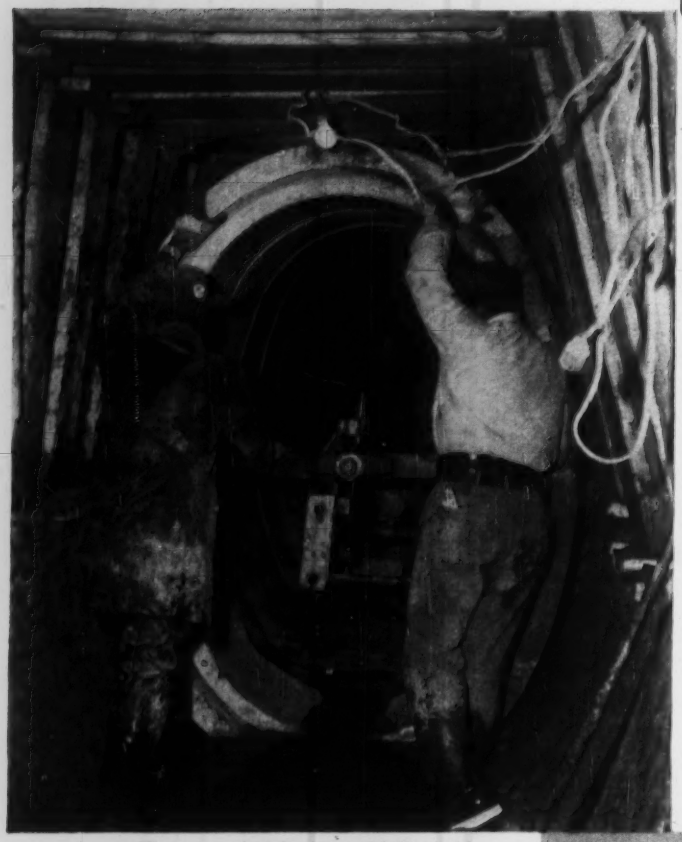
FREE HAZARD WARNING LIGHT CATALOG

R. E. DIETZ COMPANY
114 Leavenworth Ave.
SYRACUSE, N. Y.
Please send me catalog and price list.

Name..... Dept. .....
Company.....
Address.....
City.....Zone.....State.....

INNER CIRCLES PROVIDE

Unique Sewer Recovery...



The crown of an obsolete and failing brick sewer in Toledo, Ohio was removed to permit relining by the Inner Circles Method with no interruption to surface traffic.

Threads Through Obsolete Brick "Egg" Sewers

another example of
PROGRESS IN CONCRETE

Miners remove brick of inadequate sewer prior to installing Inner Circles. Brick invert is left in place to expedite hauling out brick ahead of workers and bringing in Inner Circles from behind.

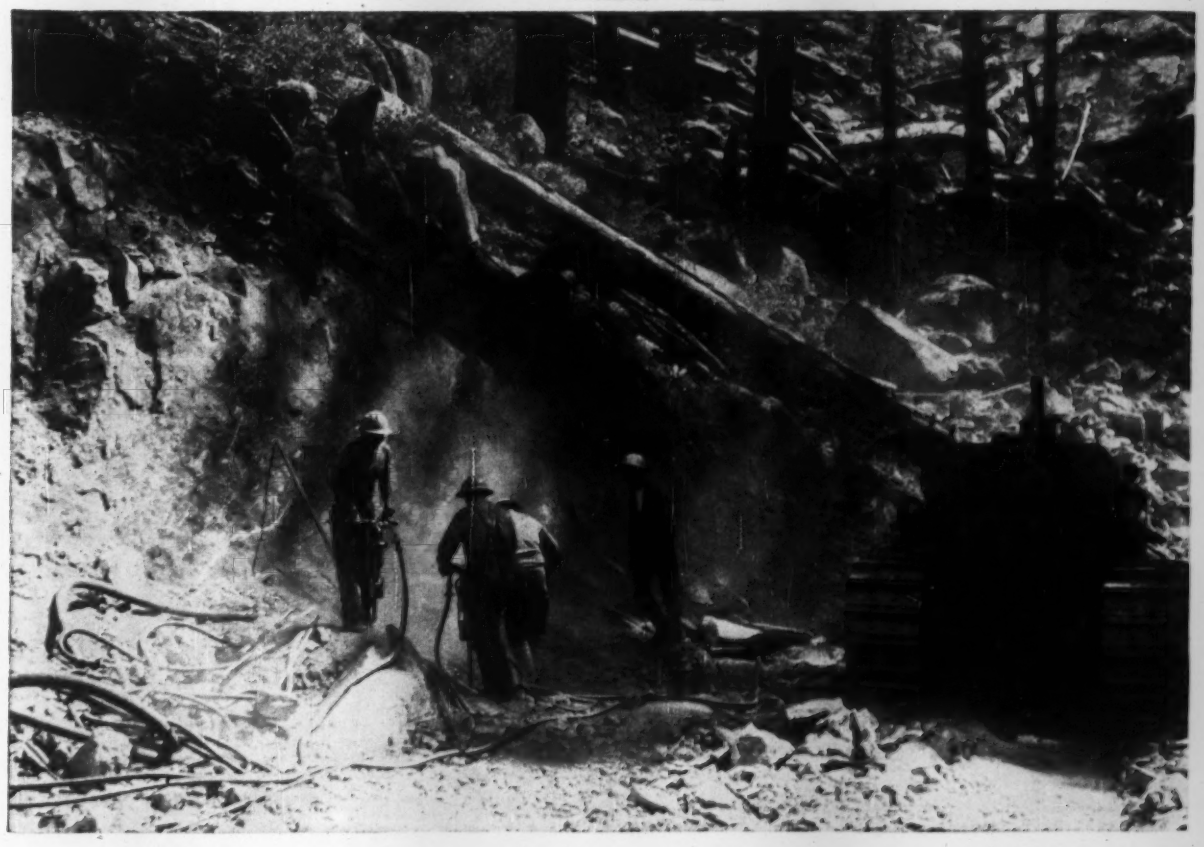
The Inner Circles Method of relining and enlarging sewers is also adaptable for box, round arch, horseshoe and other varied tunnel shapes. Open trench cuts are eliminated, thus *reducing the delays and hazards of congested traffic.* Sewers are completed faster at less cost in any weather with fewer laborers and less equipment. The new two-way Tunnelugger can operate in either direction from a centrally located shaft—quickly delivering and positioning Inner Circles at either end while mining continues at the other.

Send today for illustrated Inner Circles Brochure

AMERICAN-MARIETTA COMPANY
CONCRETE PRODUCTS DIVISION
GENERAL OFFICES:
AMERICAN-MARIETTA BUILDING
101 EAST ONTARIO STREET, CHICAGO 11, ILLINOIS, PHONE: WHITEHALL 4-5600

Inner Circles

Where the going's rough...



JACKHAMER PERFORMANCE

keeps rock-work up to schedule!

Above, three heavy-duty Ingersoll-Rand J-50A Jackhamers are doing primary drilling on an access road on the California Tri-Dam project. Here, far from the base camp, breakdowns mean serious delay and the extra stamina and high drilling speed of I-R Jackhamers pay off in production.

Wherever hand-held drills are used, I-R Jackhamers give more. The complete Ingersoll-Rand line lets you pick a drill of the *right weight* and the *right power* for the job. Save operator effort by eliminating unnecessary tool weight, and the extra air consumption of over-size equipment. Avoid the costly slowdown of under-powered drills. Jackhamers stay on the job. For dependable air power insist on Gyro-Flo compressors.

For complete information on the entire Jackhamer line, ask your I-R man for your copy of fact-filled Bulletin 4096.

CARSET JACKBIT

Ingersoll-Rand

8-562

11 Broadway, New York 4, N. Y.

DRIFTERS · JACKDRILLS · JACKHAMERS · CRAWL-IR DRILLS · CARSET BITS · AIR TOOLS · COMPRESSORS

...for treating domestic and industrial wastes

18-month test shows HI-CONE system operating costs are 44% less!

than air diffusion system

- TESTS PROVE LOWER POWER COSTS!
- LOWER MAINTENANCE COSTS!
- BETTER EFFLUENT

In the selection of sewage treatment equipment, the two most important factors are operating cost and effluent quality.

These figures from the annual report of the Manchester, England, Rivers Department, *prove* the superiority of the Hi-Cone! They're based on the operation of activated sludge plants (including a Hi-Cone System and a diffused air system) under strictly comparable conditions over a period of 18 months. Manchester is a pioneer in treatment by the activated sludge process, having first conducted experiments and tests in 1913.

Hi-Cone's power consumption was lower! Horsepower demand per million gallons treated per 24-hour day for the Hi-Cone System was 34.9% lower than the air diffusion system.

Hi-Cone's total operating costs were lower! Relative costs per million gallons treated were 42.1% lower than the air diffusion system.

Hi-Cone's effluent was better! The B.O.D. reduction was 26% greater; the suspended solids removal was 5% greater than the air diffusion system.

Use this coupon to ask for detailed information

Please send the following descriptive literature on the Hi-Cone:

☐ Cost and operating reports ☐ Report of article, "U. S. and British engineers agree on the Hi-Cone System"

☐ Hi-Cone engineering data

Name_____

Title_____

Company_____

Street_____

City, Zone, State_____

YEOMANS

1999-1 North Ruby Street, Melrose Park, Illinois

. . . manufacturers of:
centrifugal pumps • pneumatic sewage ejectors • distributors • clarifiers • mechanical aerators • digesters

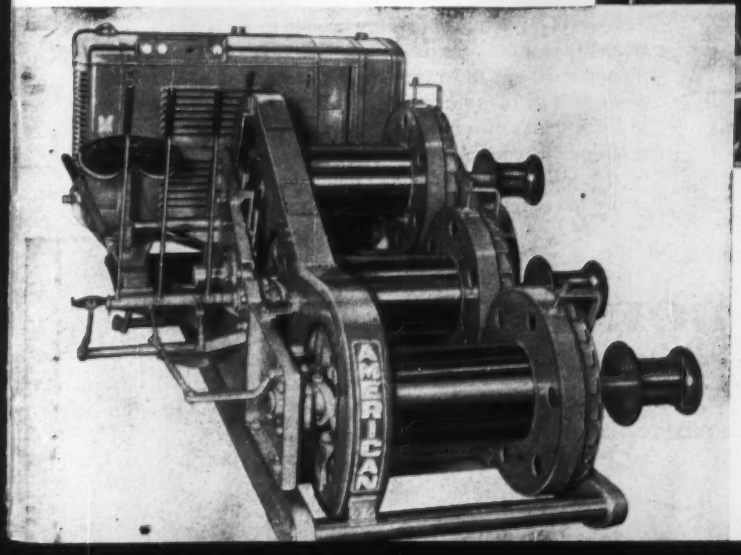
HOIST GETS WORKOUT ON 4-STORY JOB!

This job, a 2-story addition to a 2-story building, means the elevator makes only short runs—the hoist starting and stopping hundreds of times per day. The clutches and brakes of the American hoist used on the job get a real workout!

Colored glass spandrels will highlight the new Washington Title Insurance Company Building in Seattle. One hundred tons of steel, 1000 yards of concrete and 1000 yards of plaster will be used on the job. Two hundred tons of debris were removed to prepare for the addition. The 3-drum American operates platforms in the double-well tower and a Chicago boom.

On start-stop assignments like this, the power, speed and responsive controls of American hoists start loads up faster—assure safe, profitable materials handling. American's big, cooler running contracting band friction clutches and brakes provide exceptionally long life and safe performance under start-stop duty. On skyscraper jobs where there's a long haul to the top of the tower and tough stops at the bottom, you'll find American hoists' performance equally reliable!

Look around—you'll see more American hoists at work than any other kind! Why? It's contractor preference based on years of safe, highly dependable performance. Ask your American Distributor for complete technical details on this line that begins with capacities of 3,000 pounds single line pull!



AMERICAN'S BIG 70-B General Purpose Hoist has a capacity of 7,000 pounds single line pull. Available with 2 or 3 drums and swingers, this tough hoist offers an outstanding lineup of features: anti-friction self-aligning ball bearings; silent chain drive; machined gear teeth; balanced, interchangeable drums and; easily adjustable, reversible clutch and brake bands.

AMERICAN HOIST

and Derrick Company

St. Paul 7, Minnesota

HIDDEN REINFORCEMENT

Great grandmother used hidden reinforcement to restrain her figure; Lock Joint prestressed pipe design uses much the same principle to restrain the high internal pressures in present day water transmission lines. Lock Joint's hidden reinforcement consists of high tensile wire wrapped under high uniform tension around the core of the pipe.

Can you guess how many miles of such wire were used in the 120,000-foot 66" Lock Joint Prestressed Concrete Embedded Cylinder Pipeline for Wichita's water supply system? The answer will be found—not too carefully hidden—in the picture above.

Samples of all such high tensile wire used in the production of Lock Joint prestressed pipe not only are certified by mill tests, but also must meet the exacting standards demanded by rigorous tests to which they are subjected in Lock Joint's own laboratory. This is only one of the many quality control measures employed in every phase of the manufacture of Lock Joint Pressure Pipe to assure the customer the finest product obtainable.

LOCK JOINT PIPE CO.

East Orange, New Jersey

Sales Offices: Chicago, Ill. • Columbia, S. C. • Denver, Col. • Detroit, Mich. • Hartford, Conn. • Kansas City, Mo.

Pressure • Water • Sewer • REINFORCED CONCRETE PIPE • Culvert • Subaqueous

ENGINEERING NEWS-RECORD

Vol. 158 No. 21 May 23, 1957

Number of copies printed this issue: 77,701

CONTENTS

NATIONAL AFFAIRS

Jet Age Won't Outmode U. S. Airports 23
AIA Celebrates 100th Birthday 24
Political Issues Big at AWWA Conference 26
N. J. Water Plan for Raritan River 27
Rapid Transit Boosted to Ease Traffic Congestion 28
Los Angeles Outfall Gets $20.3 Million Low Bid .. 28

FEATURES

The Big Change in Buildings Over Last 100 Years 33
Pro and Con on Merits of the Architect-Engineer 42
Water Plant Features Automatic Control 51
Test Track: Tough on Builders and Autos 56

FIELD AND OFFICE

Computer Firm Sells Pipeline Net Analysis 66
Air Bubbles Thaw Arctic Ice 66

NEW PRODUCTS

Horizon Camera for Plane Table Surveys 72
Blast Hole Drill Features Hydraulic Action 73
High Capacity Pumps for Severe Service 74
Pneumatically Fired Concrete Gun 77

MEN AND JOBS

Fred Merryfield, New AWWA President 84
John Ware Receives Rags-to-Riches Award 84

BUSINESS AND FINANCE

Commercial Building Begins New Boom 111
Equipment Prices Up in April 112

LABOR

Engineers Say "No" to Union Ties 118
Long Strike Ends in Baltimore 118

Reader Comment 8
Calendar 10
Washington Observer 21
Obituaries 89
Unit Prices 90
Materials Prices 93
Construction Reports. 105
Scoreboard 108
Editorials 136

Back issues of ENGINEERING NEWS-RECORD *are generally available for the previous six months. Price 50¢ each copy except Annual Cost Issue. Semi-annual indexes will be sent on request.* ENGINEERING NEWS-RECORD *is also indexed in Industrial Arts Index and Engineering Index.*

THE CONSTRUCTION WEEK

CORPORATE PRACTICE—Members of a joint professional committee—representing the New York State Society of Professional Engineers, three of the Founder Societies (civils, mechanicals and chemicals), plus three consulting engineer groups—this week presented one brief for and one against the registration of corporations to do engineering in New York State in the public practice area. Eight members favored no change in the existing State Education Law, six signed a brief favoring practice by corporations in which licenses to practice would be held by all employees in responsible charge of engineering work; by all officers and directors who practice engineering or determine engineering policy; by a majority of all officers; and by not less than two directors. Its function fulfilled, the group refers its two answers to the represented societies.

HOMEBUILDER REVOLT?—Six Home Builder Associations representing 1,500 builders in 46 Northern California counties last week threatened to walk out of wage pacts negotiated by Associated General Contractors. Long dissatisfied because they have no voice in negotiations in which they have a signatory status, they sent a delegate to Washington to confer with the Labor Relations Board on the possibility of conducting their own negotiations and called a meeting in Sacramento to explore, as an alternative, the means of getting representation in AGC talks.

FLOOD FORTUNATELY DIDN'T REACH ESTIMATES—With a crest reaching 20.4 ft last week—instead of the estimated 25 or 26 ft—the Arkansas River's worst flood in 34 years passed Tulsa leaving it with a flood loss less than had been feared. However, severe flood was predicted southward from that city to the mouth of the Verdigris River, 50 miles away. Among towns hard hit in Oklahoma was Enid where the story might have been different had the local people supported a control project that had been authorized. Statewide, all Oklahoma highways had washouts, three major bridges, and dozens of smaller ones were washed away, with damage to highways and bridges estimated at $7 million. For all the Southwest, W. W. Wilson, Regional Administrator for the Federal Civil Defense Administration, puts the total flood damage figure at $150 million.

CIVIC CENTER PLANS ADVANCE—Dearborn, Mich., took another step last week in the planning of its civic center. Detroit architects Harley, Ellington & Day, Inc., were commissioned to proceed with a master plan for the 50 acre project and plans and specifications for the development's first building, a youth center. Construction is expected to start this year on the youth center, a police headquarters and a fire house.

All-round performer

The rugged Model 14 excels from every angle. This single-cylinder, 4-CYCLE gasoline engine (5.25 hp) pays its way with standout performance over a wide work range. Like Models 9, 19, 23A, it features exclusive Magnematic Ignition for instant starting — under all conditions.

Power partners on progress projects...everywhere!

It's a fact! Briggs & Stratton 4-CYCLE engines are most welcome partners in the front lines of construction progress. They're famous for staying right in the thick of things — running smoothly, surely — regardless of "hard knocks," heat or cold, snow or rain. Insist on these engines (up to 9 hp) for your projects, too — on pumps, compressors, finishers, tampers, concrete saws, generators, elevators . . . scores of other products for progress in construction.

4 CYCLE
BRIGGS & STRATTON
GASOLINE ENGINES

BRIGGS & STRATTON CORP.
MILWAUKEE 1, WISCONSIN

Authorized Briggs & Stratton service is nearby. Find it in the Yellow Pages of your phone book under "ENGINES—GASOLINE."

Find Us Fast in The Yellow Pages

WASHINGTON OBSERVER

- **Military shaves construction budget**
- **Reimbursements to Indiana still withheld**
- **BPR readies a new anti-pirating clause**
- **Flexible vs rigid paving up for review**

- **The military is asking for more than $1 billion worth of new facilities in the U. S., including so-called satellite air strips, missile bases and Navy air stations.** That is the broad outline of the military construction authorization now before Congress.

  The total of $1.56 billion (75% in the U. S., the rest overseas) is a saving from original Pentagon requests that began at $2.1 billion. Congress will stay with this lowest figure.

  But actual money available for construction—money voted in past years as well as this—will maintain a spending rate in fiscal 1958 at $2 billion a year.

  The rundown of new programs:

  Air Force: Plans are for $509 million worth of projects in this country, and $229 million abroad. Biggest project: $140 million for dispersal bases for B-52 and B-47 bombers.

  Army: $260 million in the U. S., $64 million abroad. Antiaircraft missile bases will account for $123 million in authorizations.

  Navy: $327 million here and $108 million abroad. Domestic air station construction will account for $125 million of the Navy's program.

- **Federal reimbursements to Indiana for right-of-way purchases will continue to be withheld** until the Senate subcommittee on roads finishes up its inquiry into charges of mishandling. The committee heard two days of testimony last week, will resume June 10. One thing is certain: The roads committees of both houses will keep a closer eye on future right-of-way transactions.

- **BPR is about ready to clarify its no-raiding clause covering consulting engineers working on highways.** This clarification, however, won't satisfy. The controversial clause (ENR Apr. 25, p. 26) says consultants may not hire engineers or technicians from federal, state, county, or city highway agencies during course of a contract on federal-aid work. "Clarification" would merely preclude hiring for work on the specific contract involved. Consultants would hire highway agency people for work on other than their federal-aid highway projects.

  The National Society of Professional Engineers is still threatening to appeal to Congress.

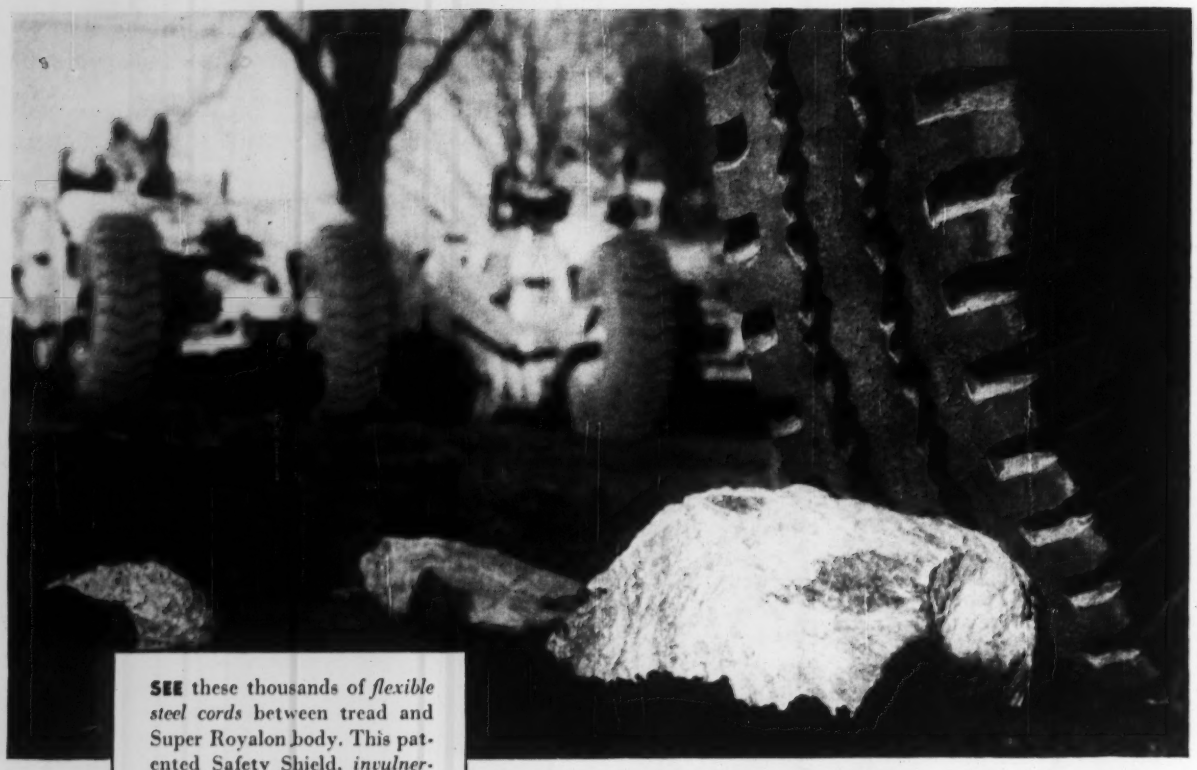
- **The old portland cement vs asphalt contest is up again.** A House armed forces subcommittee will begin soon a new inquiry into the Air Force ban on use of asphalt paving for airfields. Up for review will be the Air Force decision of a year and a half ago to install rigid pavement for jet aircraft. The committee in 1954 ordered the Air Force to stop using a price differential that favored portland cement concrete. Now the new jet requirements will be looked into again.

  Appeals from asphalt producers and paving contractors prompted the new inquiry. At the same time the Air Force is going ahead with plans to test the relative economies of various rigid pavement designs. Test sections will be built in Ohio this summer to find performance under 300,000 lb at 300 psi tire pressure.

  Also the Air Force will soon ask bids for contracts to construct a taxiway in Mississippi to help determine costs of prestressed and reinforced slab.

Cut Job Delays . . . Cut Job Costs

with exclusive SAFETY STEEL SHIELD



SEE these thousands of *flexible steel cords* between tread and Super Royalon body. This patented Safety Shield, *invulnerable* to cuts and ruptures, prevents tire failure in the tread area . . . cuts job delays and job costs 'way down!

U.S. ROYAL

Super FLEETMASTER

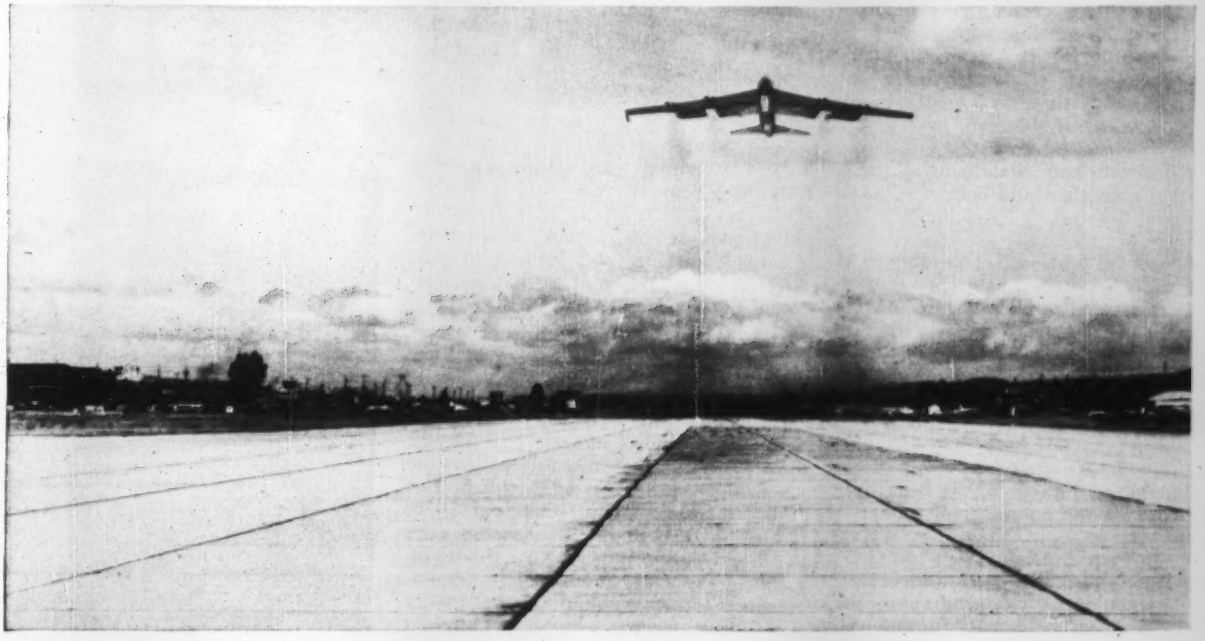
This tire's *all-new*—with money-saving advances throughout its construction. It's *all-wheel*—built for every on-and-off-the-road truck exposed to the most vicious impacts. Your U. S. Royal Dealer has it in sizes through 11.00. Call him now . . . and don't forget—specify "Super Fleetmaster" on the new trucks you buy!

US RUBBER

United States Rubber

Rockefeller Center, New York 20, N. Y.

In Canada: Dominion Rubber Co., Ltd.



ASCE's air transport conference hears . . .

Jet Age Won't Outmode U. S. Airports

The upcoming general use of jet-powered aircraft for civilian transport won't outmode the basic design and layout of present-day, first-class civilian airports. Details will have to be changed, to account for the effects of blast, heat and noise produced by the super powerful jet engines. But the U. S. won't face the need of rebuilding its airfields from scratch.

That's the meat that came out of a two-day session called in New York City last week by the American Society of Civil Engineers' Air Transport Division to discuss the impact of the jets on construction.

More than 500 representatives of aircraft manufacturers, federal, state and local governments, consulting engineers, attended the sessions.

Key problems for designers, as outlined by speakers and in discussions line up about this way:

- Pavements—need for rigidity and smoothness, and resistance to heat and fuel spillage.
- Noise—Since most municipal airports must live with neighboring home owners and industry, noise should be controlled.
- Blast—In relation to protection of personnel and property on the field and near it during takeoff.

• Runway paving effect—Willard J. Turnbull, chief, soils division, United States Corps of Engineers, Waterways Experiment Station, Vicksburg, Miss. and George W. Leslie, consulting civil engineer, Directorate of Construction, United States Air Force, Washington, D. C., took up the pavement problems, with particular emphasis on the need for rigid-type slabs. In summary, they told their listeners:

Fuel spillage on flexible bituminous pavements would not have any detrimental effect, if the spillage occurred only occasionally and at different spots so that the fuel was readily evaporated. But planes are usually parked at the same locations for servicing and fueling, and they all start the take-off thrust from the end of the runway. The spillage thus is consistent and continuous, does not evaporate, and dissolves the asphalt to expose the stone which eventually becomes loosened and broken up.

At the runway ends and on the taxiways the jet blast throws tremendous heat which actually melts asphalt. The speed with which this happens depends upon the angle at which the tail pipes are set and the height of the tail pipes from the pavement. The softened and deteriorated asphalts literally blow away.

The Air Force has spent $8 million in an effort to find the solution or to develop a remedy. A study of erosion and temperature was made using different asphaltic concrete pavements of different designs and with protective seal coats. Some seal coats were seriously affected. Some were actually lifted up and blown away. Tar-rubber asphalt, being cheaper than portland cement concrete was also tested. Although it was found tar-rubber asphalt was unaffected by spillage—it did not leach—it eroded under heat and blast and its service was reduced. The areas most affected and found critical were at the refueling and parking aprons, ends of runways, wash racks and at the hard stands.

It was also found that the heavy wheel loads of the larger planes such as the B-52 class (200 tons) cause depressions to form in the flexible pavement, especially when the subgrades and subbases had not been properly compacted. It was found that it was impossible to prevent channelling on the asphalt runways and as a result in 1955 specifications were changed to require use of portland cement concrete for all critical areas on military airfields. Mr. Leslie recommended that overrun areas 1,000 ft long and of runway width should be stabilized for emergency use only but should be able to support

. . . Jet age won't outmode U. S. airports

heavy loads. These would minimize injury to pilots and damage to aircraft.

Good housekeeping, at the airport will also be more important with the increased use of jets. Damage to engines by the suction of foreign matter into the jets costs the government $15 million a year. It therefore pays to keep the runways and even the surrounding field swept clean. Stabilizing all the adjacent grounds would help considerably toward this end.

• **Noise no problem?**—According to Mr. Donald A. Buck, manager, transport operations planning, Boeing Airplane Company, Seattle, noise is really not a problem at all—just misinformation.

"Unfortunately, the sound of the jet is new to many people," said Mr. Buck. "Public opinion regarding the noise of civil jet aircraft sometimes has been formed by sensational publicity of questionable authority, or has been associated with the operation of military jet aircraft.

"But any association between civil jet transport and military jet airplane operation should give consideration to some of the basic differences in the utility of the aircraft, which dictates its design and characteristics.

"Military jets are now in service which have one to eight engines—many of them with afterburners—and must be designed to achieve the ultimate in range, speed or altitude capabilities. The civil jet will have two to four engines with suppressors installed and must meet stringent CAA requirements for takeoff, climb, and safety.

"Fortunately, there are definite advantages to operation of civil jet transports with respect to noise when compared to operation of military jets or even commercial propeller driven aircraft.

"With the use of effective suppressors and the best climb procedures for each locality and trip operation, the jet transports are expected to be not even as noisy as are some of the present large civil transports."

Mr. Buck detailed a number of tests made by his company in evaluating the operation of a civil jet transport in a terminal area. Observers concluded that "even a simple terminal structure was very effective in reducing sound levels to an acceptable value." The noise values however were not greatly different from those obtained from the present large civil transports and may be acceptable at a terminal with low density traffic.

• **Protecting passengers**—Operations at high density airports, where adjacent aircraft may be undergoing various phases of terminal operations simultaneously, will pose special problems of heat and noise, Mr. Buck stated.

Six different barrier fence designs were tested, he said, with a solid deflector proving "very effective" in diverting both blast and noise. Eighty feet of this type of deflector fence were built from 8 ft plywood sheets and 2x4's, weighted with sandbags for use during a demonstration held in Seattle.

"Use of such fences at high density terminals would permit unrestricted ground servicing and loading of passengers and taxiing of aircraft at adjacent gate positions."

• **Navigation controls**—Of major importance to safe and efficient operation, however, said a number of speakers, are improved air navigation facilities. Studies indicate that the 22 billion passenger miles flown by the scheduled airlines in 1956 will be further increased to 60 billion in 1970. The forecasts of the Civil Aeronautics Administration indicate that this trebling of passenger miles will be accompanied by a trebling of air carrier passengers, along with a quadrupling of air cargo and a doubling of general aviation activity.

All of these forecasts point up the problem of more effective and efficient use of airports, as well as air space. The airport problem is not solely limited to providing adequate facilities to handle the airplanes and passengers on the ground. It goes further than providing sufficient landing and terminal facilities, including long enough runways and efficient taxiway systems.

Airport approach protection, is not something to be thought of specifically in connection with the use of the airport by new and increased numbers of aircraft. The increased spread of urbanization, with its resulting encroachment on existing airports by residential, commercial and industrial development have highlighted the necessity of present and continuous consideration of airport approach protection problem, said C. G. Bowers, of the Civil Aeronautics Administration.

"By airport approach protection the CAA means the clearing and protecting of the aerial paths to the airport by removing, lowering, relocating, marking or lighting existing airport hazards and preventing the establishment or creation of future hazards to air navigation," explained the speaker.

A peculiar problem is that caused by the increase in numbers and height of television and radio antennae. These tall skeletal structures and their supporting guy wires are hazardous to aviation because they are hard to mark.

FROM ONE PRESIDENT TO ANOTHER— A commemorative medal is presented to Presi-

AIA Observes

In line with the theme, a New Century Beckons, the American Institute of Architects last week celebrated its 100th anniversary in Washington, D. C., with a brief glimpse backward, a close scrutiny of today's problems, and an estimate of what needs to be done to prepare for the next century.

The purpose of the program, Leon Chatelain, Jr., AIA president said was to "discuss the complex forces which shape human environment, rather than the practice of architecture or the technical aspects of building." From Tuesday through Friday, the architects thoughtfully listened to spokesmen (and women) from the fields of technology, economics, government, art, theater and music, with the object of learning their responsibilities in future planning of man's physical environment.

The membership departed only briefly from its cultural program to reelect its present officers. Mr. Chatelain, a Washington, D. C., architect, stays on as president; John N. Richards, To-

dent Eisenhower by Leon Chatelain of the American Institute of Architects as . . .

Centennial

ledo, Ohio, as first vice president; Philip Will Jr., Chicago, as second vice president; Edward L. Wilson, Ft. Worth, Texas, as secretary; and R. S. Kastendieck, Gary, Ind., as treasurer.

The AIA also bestowed a commemorative medal on President Eisenhower; the Centennial Medal on Ralph Walker, New York City architect—for the most significant contribution of any living American architect to humanity and the planning of human environment; and the 1957 Gold Medal on Louis Skidmore, New York architect—for leadership in formation and conduct of a firm that has made outstanding contributions to the profession of architecture.

• **A century of building**—The backward glimpse was brought into sharp focus by an exhibit at the National Gallery of Art portraying the development of American architecture since 1857. (See also p. 33 of this issue.) More than 200 black-and-white photographs, and 10 huge color transparencies were displayed. (The exhibit will be kept open to the public until July 15.)

• **Where we stand now**—The scrutiny of today's problems portrayed the modern world as a pretty dismal place. The speakers criticized housing, bemoaned lack of privacy, complained about congested traffic and unplanned cities and outdid Malthus with dire predictions of vanishing resources in the face of rapidly increasing population. Two of the speakers urged creation of additional posts in the President's Cabinet as a means of solving these problems.

Said Edward A. Weeks, Jr., editor, the ATLANTIC MONTHLY: "I find an initial fallacy in the proposition that we can go on making smaller and smaller houses for larger and larger Americans."

Added Leon Chatelain: "With few exceptions, the house which is being built for today's living is a modern version of the grotesque 'carpenter's classic' of the Civil War. Its design shackles us to the living habits and household drudgery of past generations."

From Detlev W. Bronk, president, the National Academy of Sciences, came this challenge to the architects: "You have built buildings as a shelter against the elements. You have built buildings to house a man-made environment. I urge upon you that you also think of making buildings a protection against the harm that man himself may now create."

Claiming the U.S. is wasting its resources rapidly, George H. T. Kimble, director of the 20th Century Fund survey of tropical Africa, warned: "It is high time we became 'smaller-barn' minded, inuring ourselves to the idea of living with a little less plumbing, fewer gadgets, more modest homes and simpler pleasures for the purpose of enabling those in other continents, and those who come after us in our own, to live with a little more."

CSI Reviews "Tight Specs"

A meeting of the Construction Specifications Institute held in Washington, D. C., last week in conjunction with the centennial celebration of the American Institute of Architects brought out some valuable suggestions for improving building construction by better specification writing. Among them was a recommendation for elimination of the "or equal" clause. (See also ENR May 16, p 21.)

Kenneth M. Wilson, chief of the Electrical and Mechanical Engineering Division, E. F. Klinger & Associates, Inc., architects-engineers, Eau Claire, Wis., reviewed for the CSI his experience with a type of specification he called the "base bid-alternate" procedure. In this method, materials or products are specified by name of manufacturer, brand or trade name or catalog reference. However, contractors may propose substitutions under restricted conditions (ENR May 9, p. 164).

Following are some thought-provoking quotes from Mr. Wilson's talk:

"Seven years ago, our firm, having had every kind of specification trouble imaginable, decided to tighten up on its specifications. We eliminated the controversial "or equal" clause, and named specifically the products we envisioned for any given project, following the base bid-alternate procedure, which five years later was recommended and endorsed by the AIA. . . .

"We were particularly careful to utilize only the products of firms whose honesty and integrity were above reproach. We combined this tight specification with exceptionally sharp, well detailed drawings, and followed up the construction work very closely. . . .

"We found that contractors were bidding our work on a much closer margin and that they felt no additional risk in so doing, because of the clarity of our drawings and specifications.

"Manufacturers too, made their contribution. They knew they had one chance to bid our work. They had to be in line, pricewise, on their first quote or someone would beat them on an alternate. Suddenly they woke up to the fact that after bids were in, the contractor no longer controlled the job, and price cutting after bids were received was to no avail. Therefore, they bid closer on their first quotation. . . .

"We have proved conclusively . . . that tight specifications, combined with sharp, well detailed drawings are worth from $1.50 to $2 per sq ft of floor area on buildings in the $10 to $20 per sq ft range. . . .

"If we, in the design of a building, find the product of a given manufacturer fits particularly well into the overall scheme of things, then let's use it, let's name it by its right name, let's demand that we get it—not someone's idea of an equal."

AWWA Delves Into Politics; National, State

Last week's record gathering of the American Water Works Association in Atlantic City got itself knee deep into politics: State highway relocation costs; national water policy; New Jersey's water problems (see box), and some intramural politics concerning a proposed AWWA policing of its equipment specifications.

In opening a seven man panel on reimbursement of utilities relocated because of highway construction, Harry B. Shaw of the Washington Suburban Sanitary District exhorted his audience to embark on a major organized effort on the section (generally, state) level to influence legislatures and the public. Subsequent reports by the panelists made it plain that such action was already under way in a good proportion of the states, and in some instances was beginning to bear fruit.

The relocation problem has been heightened by the recent federal interstate highway program, legislation for which left utility reimbursement—with federal monies—up to the states. Eight states at present have legislation permitting partial or full reimbursement; AWWA is concentrating on the other 40. In most of these, state highway departments hold that monies derived from the collection of gasoline taxes cannot be used for any purpose except highway construction.

Results of political action by waterworks men, usually in consort with other utilities, have been spotty. At one end, the lusty Pacific Northwest Section is batting .333 in its three state area, sporting a victory in Idaho. But in Indiana, lamented Thomas W. Moses of the Indianapolis Water Co., there are a lot of politics in politics; timing was wretched; the political effort exerted by the utilities men was too little and came too late.

There was scant discussion of the merits or equitable percentage of reimbursement, but certain facts were provided by A. R. Vollmer of Baltimore. He presented a method to determine net cost of relocation that was arrived at by his firm (Whitman, Requardt & Associates) in a study made for the Connecticut highway department. Briefly, net cost is actual cost of the new facility plus cost of temporary service less depreciation reserve of old utility less any salvage value it may have.

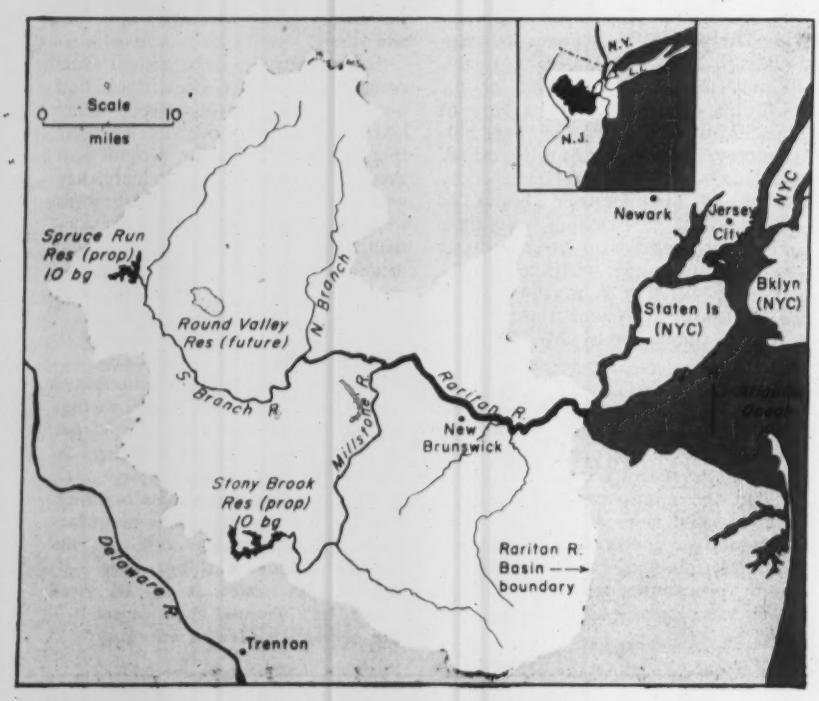
• **National water policy**—National politics of the frustrating variety was the essence of comment by Prof. Abel Wolman, Johns Hopkins University professor of sanitary engineering, on national water policy in preface to presentation of AWWA's most recent policy statement (ENR May 2, p. 25). In the light of failure by Congress to enact a unified national water policy after 25 years of urging, he had a pessimistic picture to present to the delegates.

Congress, he feels, obviously does not yet recognize a need for a national water policy, nor does it want one, perhaps, because it would interfere with Congressional and local liberties in dealing with specific projects. The lawmakers seem to prefer freedom of action to the organized policy that engineers recommend, he ventured. In genreal, he noted, the penalty of not having a definite policy must be felt before affirmative action is taken to establish one.

Professor Wolman's comments were couched in wry language, indicating where he and many other engineers had stood through the years. But the lingering reality of 25 years of inaction on a national water policy, he suggested, warrants re-examination of the basic supposition: A unified water policy is actually needed.

• **Equipment certification**—Politics of the intramural type over the proposed AWWA equipment and material certification program was much in evidence at the beginning of last week's six day meeting, but a threatened ruckus over a whole-hog program subsided into general agreement on a foot-in-the-door approach by week's end.

Last January, the AWWA board approved in principle a plan for policing its specifications for manufactured waterworks products. Since that time, several methods of certification prepared by AWWA failed of approval by



State Water Plan

The project that could put the State of New Jersey into the water resource construction business ahead of all other states was formally unveiled before last week's AWWA convention by Governor Robert B. Meyner.

Although he kept pretty much to generalities, the governor did forthrightly endorse the concept of state action on the water supply problem, with strong implication that such action should include actual construction of projects beyond the scope of local agencies.

Specifics of the actual plan at hand were presented by industrialist William H. Baumer for the privately financed but executive-appointed State Water Resources Advisory Committee which is recommending the project to the governor.

Proposed is a relatively modest $14 million project consisting of two 10 billion gal reservoirs on the Raritan River,

and Its Own

the association's lawyers and by legal counsel for many interested manufacturers on a question of restraint of trade.

By meeting time, the confusion engendered by possible legal entanglements was rampant to the point where motives were being questioned in private conversations. The air cleared after numerous conferences through the week and a public statement by AWWA Secretary Harry E. Jordan confessing legal frustration. Everyone appeared satisfied with an AWWA board decision on Friday—under it, existing specifications are to include a clause allowing a purchaser to request a written statement from the seller that the product complies with AWWA specifications. In addition an AWWA seal of approval is to be developed, for use by those manufacturers desiring blanket certification of a particular product.

• **Water rates**—Members of a general session panel on water utility earnings came up with many figures designed to support the waterworks industry's drive for higher water rates, an old campaign that has stepped into high gear during the last year. Study findings were presented which showed that the amount of investment per dollar of gross revenue by water utilities is about twice that of the electric power industry and three times that of gas companies.

Panel moderator Louis R. Howson, consulting engineer of Chicago, stated that water utilities have always been paid for by those who use the service; future construction should therefore be financed either directly or indirectly from revenues.

Mr. Howson's view for water contrasted with an opinion for sewage facilities by L. N. Thompson, St. Paul, Minn. Water Department, and R. J. McLeod, of the Washington Suburban Sanitary Commission, that the sewer service charge should pay for operation and maintenance, but that new construction is better financed by bonds retired by a general tax levy.

Messrs. Thompson and McLeod were reporting on their analysis of questionnaires returned by 439 cities on joint administration of water and sewage systems. Conclusions were that some degree of joint operation was both desirable and economical: For smaller cities the two were held best under one head, larger cities would find advantage in top level control over design and supervision.

Whereas a panel on the question of recreational use of reservoirs at last year's meeting answered resoundingly in the negative, a less restrictive view was taken last week by Daniel P. Morse of the Indianapolis Water Co. and John W. McFarland of the East Bay Municipal Utility District in Oakland, Calif. Both cited partially permissive programs recently under way or about to begin, stressing that the degree of subsequent treatment of the raw water and time required for reservoir water to reach points of consumption were factors to be considered. A responsible waterworks official was felt to be the best guard against excessive public use of reservoirs.

• **Air conditioning**—A committee report on use of water for air conditioning cooling purposes documented ever increasing peak load consumption all over the country, but noted an increasing amount of controls over such use. In 1955, 81 communities had established special controls over non-conserved cooling water; now 181 cities have them. Nineteen of these embody special charges, either a surcharge per ton of capacity or a consumption charge in the form of a minimum bill based on a certain percentage of peak month capacity—much as electric utilities do.

At a technical session on applying fluorides, ten of eleven speakers cited their own experience records showing no trouble at all, particularly regarding variation of concentration and precipitation of fluorides in the distribution system. The eleventh speaker, Benjamin C. Nesin, chemist with the Bureau of Water of nonfluoridating New York City, spoke of variation and fallout problems of four unidentified cities.

The trend by water plants toward handling the flocculent alum in liquid, rather than dry, form was given a boost by cost figures compiled by James E. Kerslake of the Milwaukee water department. Changeover costs, including plant labor, came to $23,500, while savings with liquid alum are running about $5.60 per ton, $3.60 less in purchase price and $2.00 less in handling costs. The changeover is expected to be paid off in two years.

Two basic research papers that promised some needed answers were presented by members of the Robert A. Taft Sanitary Engineering Center, Cincinnati, Jesse M. Cohen, told of his work with organic polymers, or synthetic resins, as coagulant aids. They are especially advantageous for overloaded water plants. F. M. Middleton has developed laboratory equipment that has been successful in analyzing organics that cause taste and odor problems in water. Using an activated carbon filter, organic compounds can be isolated and then extracted.

Fred Merryfield, professor of sanitary engineering at Oregon State College, Corvallis (see page 84), succeeded Paul Weir, general manager of the Atlanta, Ga., Water Department, as AWWA president last week. L. S. Finch, vice president and chief engineer of the Indianapolis Water Co., is new vice-president. Over 3,100 AWWA members and wives registered at the convention, beating by more than 500 the previous record set in 1955 in Chicago.

for Raritan River Revealed

at Spruce Run and Stony Brook. Water would be released as required to provide an additional 80 mgd of safe yield from the stream at Bound Brook and to raise existing minimum flow of 45 mgd to 100 mgd. The state would simply sell raw water to those who would come and get it from the stream.

Raritan River water would serve the basin and also the populous and water short northeastern region of the state adjacent to New York City. Consumption in this area is increasing by some 10 mgd a year. The Raritan watershed is capable of supporting another 30 billion gal of reservoirs, good for 100 mgd of safe yield, either on-river or at the high Round Valley site.

The Advisory Committee's consultants, Whitman, Requardt & Associates, Baltimore, estimate a 2 to 3 year design and construction period for Spruce Run Dam and reservoir. So if the project were prosecuted promptly New Jersey would have a project in operation a number of years prior to California, which is in the process of letting contracts for access and preliminary site work at huge Oroville Dam on the Feather River. Actually, New Jersey is now the only state in the water supply business; it took over operation of the old Delaware and Raritan Canal for industrial and potable water supply in the 1940s.

Discussion of the Raritan scheme by Charles H. Capen, consulting engineer of Newfoundland, N. J., and former AWWA president, indicated that it was not going to have smooth sailing. Noting that it was only the latest of many proposals for Raritan River development—most of them bad—Mr. Capen felt that the immediate aim should be to pump Raritan water into a reservoir at Round Valley and to feed filtered water from there through gravity pipelines to the north.

Traffic and Transit

Rapid transit boosted as answer to city congestion

Action at six widely scattered points last week highlighted growing concern with the need for more adequate municipal rapid transit to ease increasingly congested metropolitan areas.

In at least three cases the action took the form of a subsidy or suggested subsidy to a transit system through the device of relief from certain taxes. The rest were concerned with comprehensive plans for rapid transit service.

The most elaborate of the actions was contained in recommendations of a special legislative committee which studied the problems of the Chicago Transit Authority and other transit systems in Illinois.

Principal proposals were for financial relief through the use of present state gasoline tax revenues to aid such transit systems, plus such other measures as removal of motor fuel taxes on local, city and suburban lines; legislation to reduce state and other license fees to a minimum reasonable amount; release of the Chicago Transit Authority from city utility taxes, franchise taxes and park boulevard use payments.

Introduced in both branches of the state legislature, although given little chance of passage, were proposals to divert $30 million from the state gasoline tax for publicly owned local mass transit and other measures that would provide that counties receive half of the state's automobile license fee receipts, the fees to be used, among other things, for "relieving highway congestion, promoting more efficiency in the use of highways," and specifically provide that the money could be spent for improving and extending subways, elevated lines, and other local transit.

In Iowa, the legislature, passed over the veto of the governor, a bill granting tax relief to urban transit companies. The law eliminates state registration fees for each bus and compensation taxes for each bus. These fees, which have gone as high as $250 per bus, are to be replaced by a flat $25 annual fee.

And in Rhode Island, Governor Roberts signed a new law that relieves the United Transit Company of Providence of an annual state tax originally imposed for operation of a street railway. The company abandoned its street cars in 1949. The relief from the tax may amount to nearly $100,000 a year.

• **Other actions**—Meanwhile other communities were considering transit problems.

The California Senate Transportation Committee had reported a version of a bill designed to set up a mass rapid transit system in the Los Angeles area. Calling for the creation of a Los Angeles Metropolitan Transit Authority, the bill originally would have permitted the commission to operate in Los Angeles, Orange, Riverside and San Bernardino Counties. At the request of senators from the adjacent counties, however, these areas were removed from the bill and as it stands the measure affects only Los Angeles County.

According to Assemblyman Charles H. Wilson of Los Angeles, the first move by the proposed authority would be the purchase of the Los Angeles Transit Lines and the Metropolitan Coach Lines.

In Ohio, the Citizens League of Cleveland called on county commissioners to appoint a Citizens Transportation Study Commission to study a proposed downtown Cleveland subway.

Erection by Skyhook

Guided by a walkie-talkie from a platform 145 ft above ground, a helicopter lowers into place a 7 ft section of steeple for Kirk-in-the-Hills Church, in Bloomfield Township, Mich. Two of the craft, working in relays, repeated the operation five times last Saturday to place all sections of the 40 ft spire.

Performed in a steady rain, the 3 hr job went off without a hitch, to the delight of a large crowd gathered on the church grounds. A week earlier, gusty winds and technical difficulties had thwarted a similar effort.

To make erection easier, the 2,000 lb hollow cast-iron steeple was cut into five 400 lb pieces, ranging in length from 6½ ft to 13¾ ft.

The helicopter did the job at a fraction of what it would have cost with a crane, according to Nathaniel Saulter, general manager of the erection firm, Acorn Iron Works, of Freeland, Mich. He said they will use the method for another steeple in Ann Arbor and a flag pole in Denton, Mich.

Whirl-Air, Inc., furnished the helicopters and pilots.

Ocean Outfall

Five mile Hyperion line gets $20.3 million low bid

Low bid received May 15 on a 5 mile long, 15 ft ID effluent outfall for Los Angeles' Hyperion sewage plant is $20.3 million, submitted by Hyperion Constructors, a six company joint venture. Although this is substantially higher than the engineers' estimate of $18.1 million, chances are the contract will be awarded.

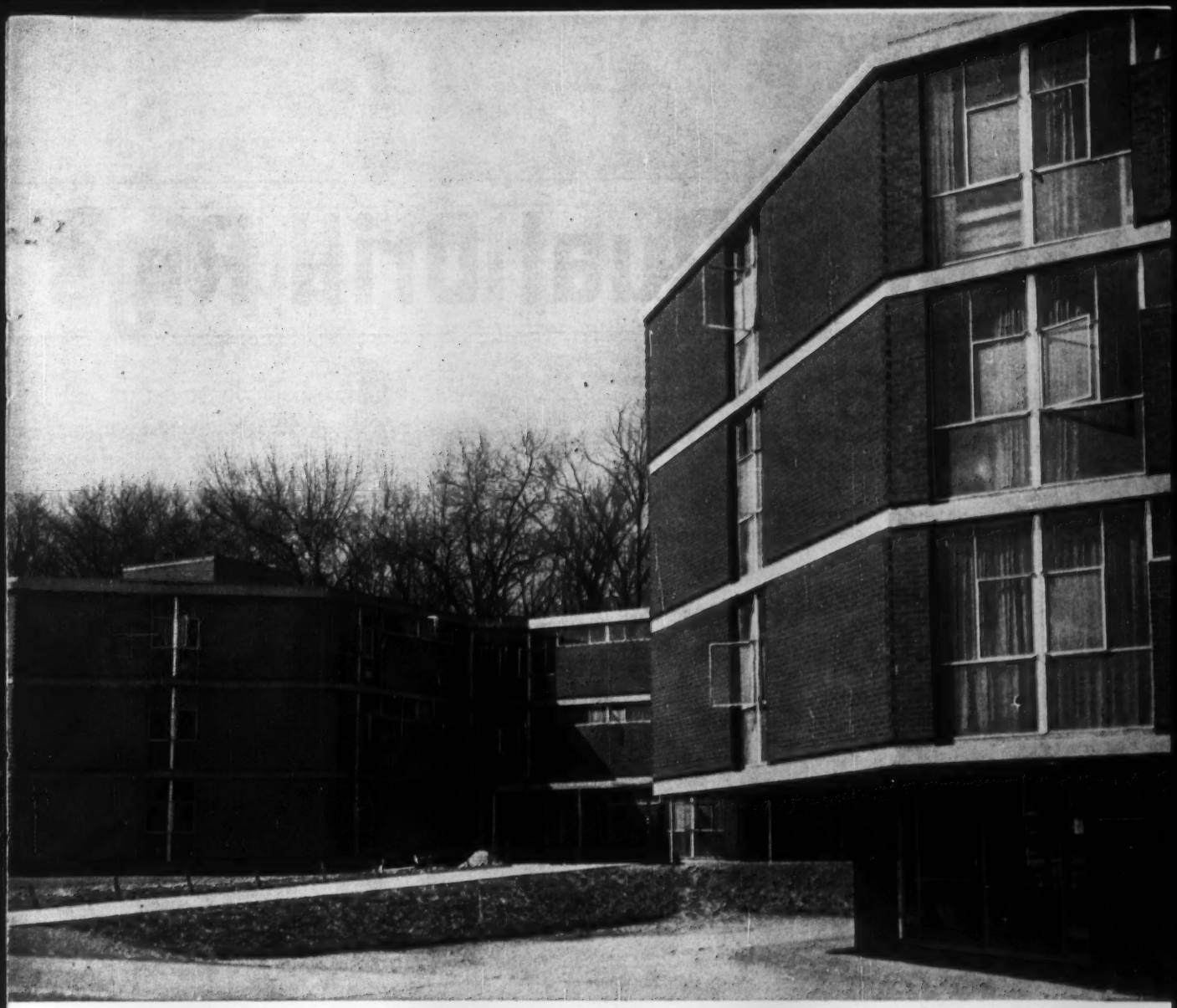
The long effluent outfall presented the greatest cost uncertainties of any of the elements of the Los Angeles sewage works program. It is probable that the Board of Public Works will accept this bid and defer construction of an effluent pumping plant.

The low bid of $20,297,530 was entered by a joint venture of De Long Corp., Healy Tibbitts Construction Co., Peter Kiewit Sons Co., Macco Corp., Raymond Concrete Pile Co., and Tavares Construction Co. Second low at $21.8 million was S. A. Healey Co. and Brown & Root, Inc. Third and highest bidder at $23.2 million was Merritt-Chapman & Scott Corp.

The job includes laying 12 ft ID concrete pipe in depths up to 190 ft 5 miles out into the Pacific Ocean. The line splits into twin diffuser sections each nearly 4,000 ft long of 102 in. and 72 in. pipe. The low bidder has not announced what pipe placing scheme will be followed on what is probably the biggest outfall construction job undertaken. (A sludge outfall now under construction by virtually the same contractors at Hyperion extends 7 miles into the ocean but diameter is only 22 in.) It may be that placing will be from some form of man-made island for which DeLong Corp. has become well known. Most likely, however, pipe will be preassembled on a barge or barges in relatively long sections and lowered into the water.

Bids were received for both the line as a whole and the line in two sections—one part for on-shore pipe and the first 3,699 ft of ocean pipe and the other for the rest of the pipe and the diffuser.

• **Plant bids coming**—Bids for enlargement of the treatment plant proper are being taken this week. Estimated at about $4 million, this work will be the last major feature of the current Hyperion modification program (assuming the effluent pumping plant will be deferred for a couple of years to provide ample funds for the effluent outfall). The modification program will include construction of additional primary settling tanks, a new headworks building and 1,500 ft of a main trunk sewer.



BETTER APPEARANCE is achieved with the help of Atlas Mortar Cement in new men's dormitories at Valparaiso University, Valparaiso, Ind. According to Masonry Foreman James S. Sedan, "This is the best mortar I have ever used —has remarkable workability and stays workable." Project architects: Hare & Hatch, New York; Contractor: Hagerman Construction Corp., Fort Wayne, Ind.

Modern masonry for modern design laid with ATLAS® MORTAR Cement

- Better mortar workability characteristics are the basis for better masonry.
- Field reports confirm that Atlas Mortar contributes to excellent workability, high yields, and weather-resistant masonry.
- Quality-controlled manufacture of Atlas Mortar promotes uniformly good performance and appearance. (Complies with ASTM and Federal Specifications.)

For further information, write Universal Atlas, 100 Park Avenue, New York 17, N. Y.

* **"ATLAS" MORTAR CEMENT** is the registered trademark of the masonry cement manufactured by the Universal Atlas Cement Company.

M-64

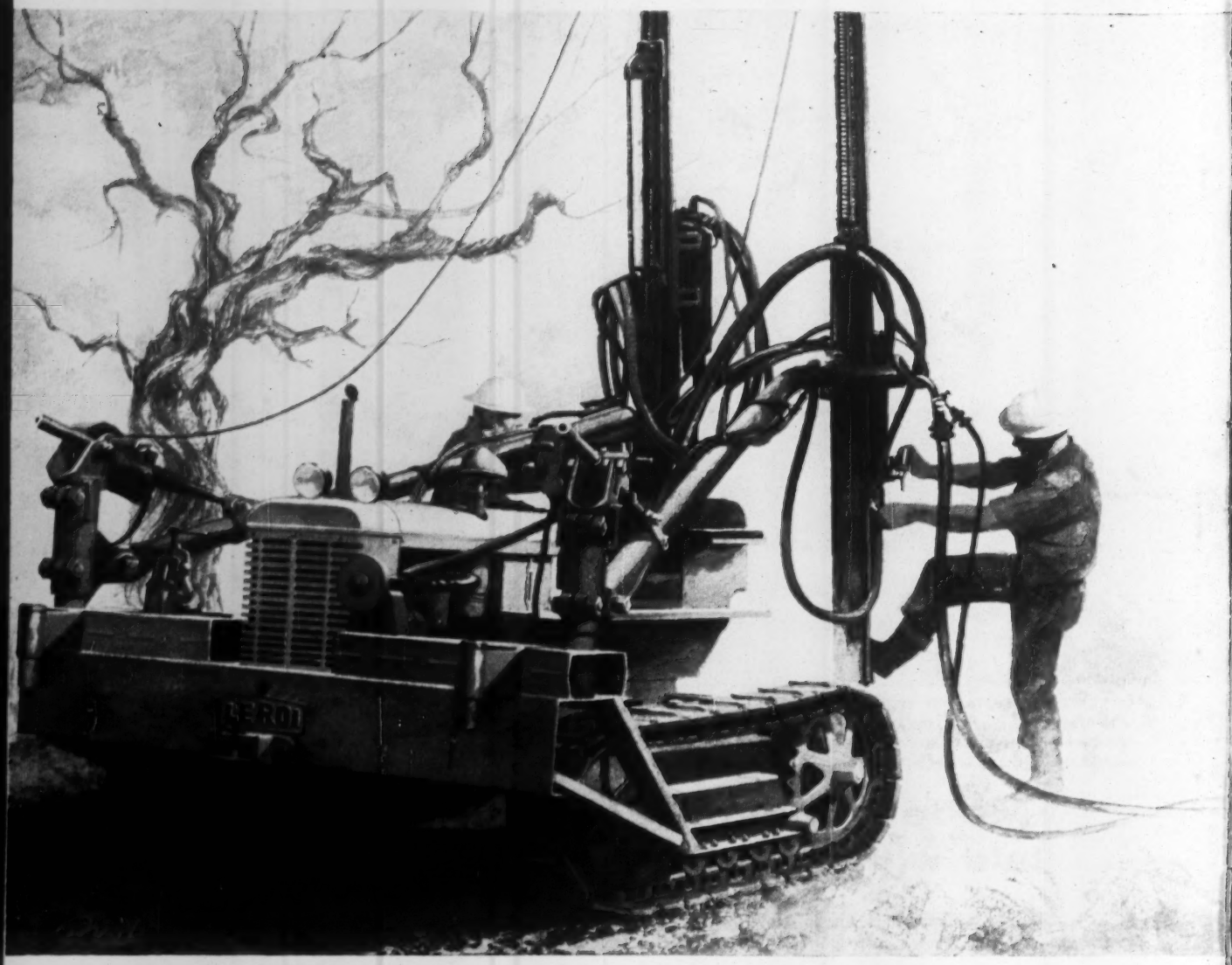
UNIVERSAL ATLAS CEMENTS

USS

UNIVERSAL ATLAS CEMENT COMPANY—member of the industrial family that serves the nation—**UNITED STATES STEEL**

OFFICES: *Albany · Birmingham · Boston · Chicago · Dayton · Kansas City · Milwaukee · Minneapolis · New York · Philadelphia · Pittsburgh · St. [illegible]*

LeRoi Dual Drill Rigs



Check these comparative features!

mobility:

1.

The T-286 can quickly speed across job-sites without compressor power.

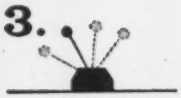
The air-driven track-type wagon drill can't move without an air compressor — must be loaded and unloaded by a crane.

2.

The T-286 unit can travel 7 mph — and pull the compressor, too!

The air-driven unit can only travel 3 mph.

3.

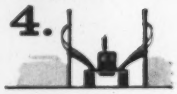


The T-286 has three forward speeds for better control, faster movement.

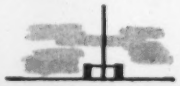
The air-driven unit has but one forward speed.

cost:

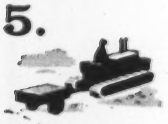
4.



The T-286 costs 20% more than an air-driven track-type wagon drill, BUT you get two drills instead of one—twice the production!



5.



The T-286 tractor unit alone costs slightly more than the track-type drill carrier, but it has extra usefulness—does other tractor work when not drilling.

T-286 unit features more power and speed for quicker positioning than track-type wagon drills.

Out-perform All Others!

Air motors do all the drill positioning, relieve most of the manual work

The Le Roi T-286 is a dual-drill rig mounted on a 28 hp crawler tractor. It gives you twice the production of competitive single-drill self-propelled units — yet costs only slightly more.

Its power and speed exceed that of other crawler wagon drills, giving faster movement across job-sites . . . quicker positioning . . . higher production.

Besides being a major time-saver, the tractor is useful after rock-work is completed; drills can be easily removed to permit use in cleanup work and other odd jobs. Yet the tractor itself costs only slightly more than a slow-speed air-driven self-propelled drill carrier!

Goes Anywhere

The T-286 is ideal for work-sites that are inaccessible to standard-type drill rigs. It can easily travel to places where manual positioning of wagon drills is slow and impractical — quickly reaches spots formerly drilled only with even slower and doubly back-breaking hand-held rock drills!

The crawler tractor takes rough ground easily. A parking brake and two leveling jacks stabilize the tractor while drilling on rough or uneven ground.

In operation, air motors position the drill arms through a wide arc, permitting easy, quick setups for any number of holes without relocating the machine. Each arm has a 7 ft. radius through 220 degrees . . . distance between drills is a maximum of 24 feet, allowing a variable drill pattern.

Drills High or Low Holes

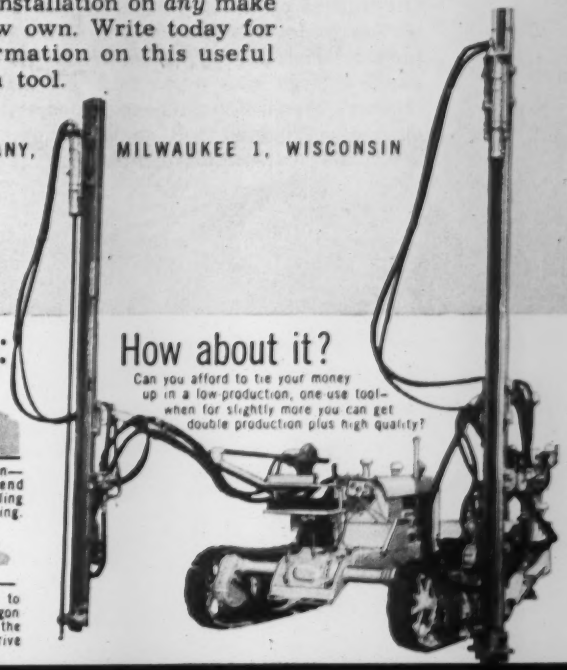
Air motors change the positioning of the air feeds, too, through 360 degrees. This means easy placement of horizontal flat holes as high as 9 feet above ground level, as well as toe holes either backward or forward. Feed is positive whether the drill is being fed forward or retracting, giving faster drilling with both steel and tungsten carbide tipped bits.

The heavy-duty feed allows the use of either 3½ in. or 4 in. drifter with 10 ft. travel and 8 ft. steel change as standard equipment. Other size steel changes are available.

The dual drill rig may be bought separately for installation on *any* make tractor you now own. Write today for complete information on this useful high-production tool.

LE ROI DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY, MILWAUKEE 1, WISCONSIN

MANUFACTURERS OF CLEVELAND AIR TOOLS, TRACTAIR®, PORTABLE AND STATIONARY AIR COMPRESSORS, AND HEAVY-DUTY INDUSTRIAL ENGINES. WRITE US FOR INFORMATION ON ANY OF THESE PRODUCTS.



production:

6.

With its double drills, the T-286 can put down twice the footage of any air-driven wagon drill; handles holes up to 2¾ inch and depths to 24 ft.

7.

The T-286 can put in many holes—10, 20 or 30 — from one tractor setting. Wasteful moving and set-up time is eliminated.

The air-driven wagon drill puts down one hole per setting — must be repositioned for each hole.

utility:

8.

The T-286 has multiple uses—can do odd jobs, towing, cleanup work when drilling job is completed.

The air-driven wagon drill has only one use — is a dead investment when not drilling.

manpower:

9.

The T-286 needs two men— but both of them spend most of their time drilling — making hole — producing.

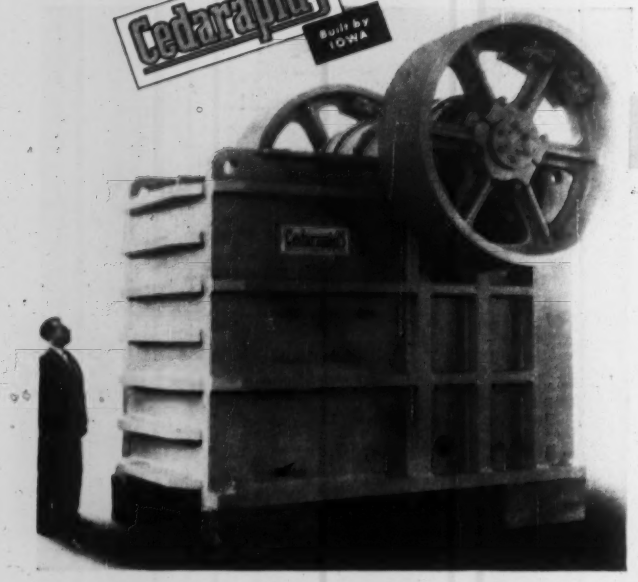
It also takes two men to operate the air-driven wagon drill, but only one is on the drill—the other must drive and position.

How about it?

Can you afford to tie your money up in a low-production, one-use tool—when for slightly more you can get double production plus high quality?

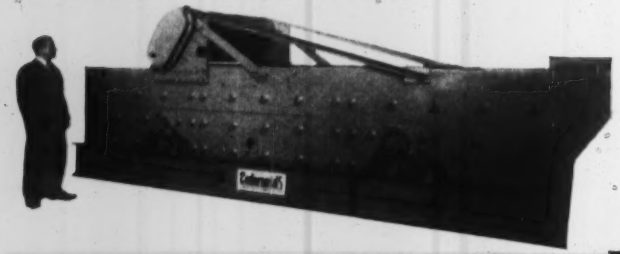
BIG-NEW

Cedarapids Built by IOWA



BIG SECONDARY

The Cedarapids 55″ x 30″ Roll Crusher is the efficient teammate for the big primary crusher, or can be used wherever there's need for high capacities of fine-crushed products. Output ranges up to 850 tons per hour, depending upon the size of the finished product. The large 55″ diameter of the rolls easily handles large size feed. Like all Cedarapids roll crushers, Model 5530 can be equipped with two smooth or two corrugated roll shells, or one of each, to meet operating requirements.



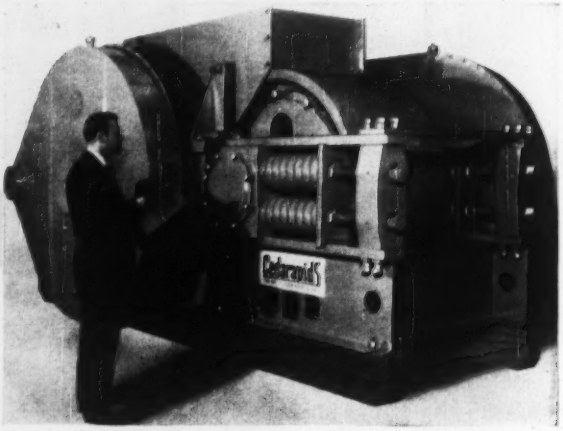
Before you plan your next big crushing and screening operation, be sure to investigate the "big-production-at-low-cost" advantages of Cedarapids equipment. Your Cedarapids distributor will help you plan for higher tonnages and greater profit.

Cedarapids Crushers and Screens to increase your Plant Capacity

The amount of aggregate needed for the National Highway Program will equal, in volume, five hundred Egyptian pyramids, each covering four city blocks and 40 stories high! You'll need big-capacity equipment to produce your share of this mountain of material. That's why Cedarapids has engineered big new crushers and screens to help you increase your plant capacity.

BIG PRIMARY

This newly engineered 42″ x 48″ Jaw Crusher meets every demand for big primary crushing operations with capacities ranging up to 775 tons per hour, depending upon the size of product desired and the characteristics of the material. The crusher base is stress-relieved to insure maximum strength for weldments, and fabricated with heavy rib-reinforcement to withstand the punishing shock of heavy loads.



BIG SCREEN

Big crushing production demands big screening capacity. The new 60″ x 16′ triple-deck Horizontal Vibrating Screen is designed to insure accurate gradation of the big-volume output of Cedarapids crushers. The horizontal position of the screen provides as much as 12½% more screening area than an inclined screen of the same length! The screen box and screen cloth support frames are stress-relieved for longer service life and lower maintenance costs.

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa

START OF A NEW ERA—Home Insurance Building, Chicago, was the first to have iron columns in the walls to support the floors.

END OF A CENTURY—Lever House, New York, typical of today's skyscrapers, has skeleton framing and continuous windows.

In the past 100 years of the AIA, here were . . .

The Big Changes in Buildings

- **The skyscraper evolved, following development of safe elevators, skeleton framing and curtain walls.**
- **Industrial buildings were developed into efficient shelters for mass production.**
- **Varieties of construction materials increased from a comparative few to thousands.**
- **House construction was speeded by adaptation of industrial assembly-line techniques.**
- **Mechanical and electrical advances made possible close control of interior conditions.**

In celebrating its centennial last week, the American Institute of Architects looked back with deep satisfaction over a century of progress in building design. Though architects debated among themselves as to whether there had been real advances in esthetic treatment, no one doubted the improvements during that period in planning, structure and control of interior environment of buildings.

The AIA was founded in 1857. It was started in New York City with 13 local architects, inspired by Richard Upjohn, architect of New York's Trinity Church. Upjohn was elected president and served in that capacity for 19 years. After some difficulties at first, the group flourished, and chapters

sprang up across the U.S. The society now boasts 12,000 members.

When the AIA was formed, few buildings were more than 100 ft high. Esthetic treatment consisted of false fronts with an abundance of ornamentation and copies of classic Gothic, Greek and Roman styles.

Principal structural materials in 1857 were brick, stone, timber and wrought or cast iron. Exterior walls were load-bearing; some of the taller buildings of the time had brick walls 5 ft or more thick. Openings in the walls therefore, were kept small, and there was a tendency for interiors to be poorly illuminated and badly ventilated. Candles or gas were burned for artificial illumination. And a fireplace or cast iron stove (burning wood or coal)in the rooms was the chief means of heating the premises.

Also in 1857, central water-supply systems and sanitary sewers were the exception rather than the rule. And toilets usually were in outhouses.

Though the founders of the AIA may not have realized it, the stage was set for big changes in building design.

Increased business activity and growth of urban population was creating a big demand for space in the heart of cities. As land prices rose, a trend toward taller and taller buildings developed. Fortunately, designers and builders were ready:

▶ Structural theory and knowledge of strength of materials had advanced to the point where problems presented by the higher structures could be solved economically.

▶ Improvements in iron metallurgy made greater use of iron columns and beams practical.

▶ A patent was issued in 1867 to

EMPIRE STATE BUILDING, New York City, 102 stories tall, represent the high point in the evolution of skeleton framing.

From Piles of

• **Enter the curtain wall**—In 1884, the first step was made toward liberation of buildings from the restrictions imposed by bearing-wall construction. The 10 story (later increased to 12) Home Insurance Building in Chicago, designed by W. L. B. Jenney, was completed. It was a near approach to skeleton-frame construction.

To obtain large windows, Jenney reduced the size of masonry piers on the exterior by relieving them of all floor loads. He supported the iron floor-beams along the perimeter on cast iron columns encased in the piers.

The thin spandrel walls were carried on cast iron lintels, which rested on both the masonry piers and brackets attached to the iron columns. Thus, the masonry piers supported only their own weight, plus possibly the weight of the spandrel walls, depending on the execution of the design.

Three years later, the 12 story Tacoma Building in Chicago, designed by Holabird & Roche, was built without bearing walls on two street frontages. It was the first example of true skeleton framing.

The framing consisted of cast iron columns and cast iron beams, with the spandrel beams in each floor supporting the wall of the story above. Because the walls in this type of construction are carried by the frame in each story, they became known as curtain walls.

• **Skeleton framing**—Within three or four years after completion of the Tacoma Building, about a half-dozen buildings were constructed in Chicago without any bearing walls. The first all-steel skeleton—for the Rand-McNally Building in Chicago—was erected in 1889. And following construction of the 21 story steel-framed Masonic Temple in 1890, use of skeleton framing spread to other cities.

At about that time also, designers stopped calling for cast iron for important buildings. They continued to utilize wrought iron framing for another five years, after which they shifted to structural steel or reinforced concrete.

Joseph Monier in France for reinforced concrete.

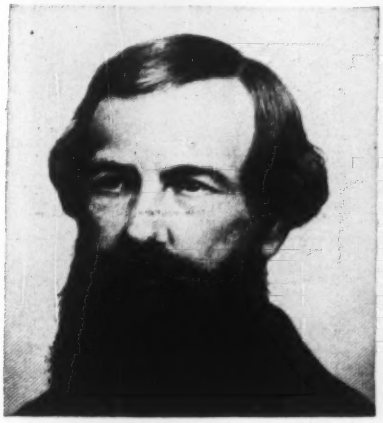
▶ The feasibility of heating buildings with steam from a central plant in the basement had been demonstrated.

▶ And even while the first meetings of the AIA were being held, the first passenger elevator with an automatic safety device—invented by Elisha Graves Otis—was being installed.

It was immediately evident that elevators made upper floors of the taller buildings just as valuable as lower. As the years went by, buildings went higher and higher, and their masonry walls became thicker and thicker. For a while, it appeared that the only limitation on height was the strength of stone and brick.

However, this limitation never materialized; structural changes soon became noticeable. To save space, building designers replaced interior bearing walls with iron columns and girders. (This type of construction received a temporary setback after the metal framing was damaged in a series of fires in wood floors; but with the development of effective fireproofing in the 1870's and 1880's iron framing regained popularity.) Then, terra cotta arches were substituted for wood floors. And use of iron lintels made possible larger windows in the exterior walls. Soon, 12 story buildings were fairly common, and at least one 16 story structure was built.

Masonry to Slim Metal and Glass Shafts



E. G. OTIS—His safe elevators made skyscrapers practical.

LOUIS SULLIVAN—His designs influenced modern architecture.

F. L. WRIGHT—His ideas stimulated new thinking.

In 1906, wide-flange beam and column sections were introduced. And by 1916, a record height of 60 stories was reached, with erection of the Woolworth Building in New York City. Steel framing reached its pinnacle in 1930, when the Empire State Building was constructed in New York with 102 stories (since extended by addition of a television tower to 1,472 ft above street level).

In 1893, construction of the museum building at Leland Stanford, Jr., University, Palo Alto, Calif., by E. L. Ransome, had demonstrated the practicability of monolithic concrete. Ten years later, the Ingalls Building in Cincinnati was built of reinforced concrete to a height of 16 stories. In recent years, many reinforced concrete buildings have been built in the U.S. 22 and 23 stories high, while heights of 38 and 40 stories have been reached in South America.

• **Effect of zoning**—Because the tall buildings crowded together in the centers of cities cut off light and air from their neighbors, the desirability of imposing restrictions on their size became evident. In 1916, New York City passed a zoning ordinance limiting the height to which skyscrapers could go without setbacks. This law set the pattern for other cities and for many years exerted a basic influence on architecture.

Generally, height to the first setback was made a function of the width of street. Above that level, additional setbacks were required to keep within an envelope prescribed by the law. Skyscrapers with tops resembling a flight of stairs became quite common in New York.

However, a trend developed toward use of large setbacks to reduce the number of steps required, and soon skyscrapers topped with towers became popular. And in the 1950's many buildings were designed to occupy only a relatively small portion of their site or were constructed with large but low bases and extended to their full height as slender towers.

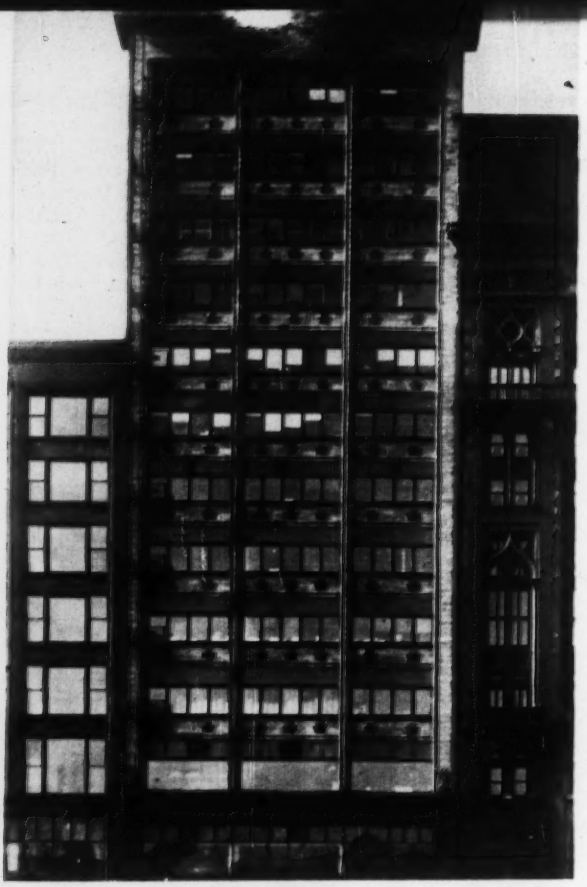
• **Evolution of thin walls**—Despite the development of skeleton framing and replacement of bearing walls by curtain walls for skyscrapers, architects continued to call for masonry walls through the first half of the 20th Century, though they tended to increase window area. And until relatively recent times, the walls were at least 12 in. thick and weighed about 130 psf, principally because of restrictions imposed by antiquated building codes and partly because of the conservatism of architects and their clients. Esthetic treatment of facades followed forms of the past; the Woolworth Building, for instance, was designed in Gothic.

Yet, toward the end of the 19th Century, Louis Sullivan had demonstrated that ornamentation and false fronts were not essential to the beauty of tall buildings. He allowed the structure to be plainly visible, used continuous horizontal lines of windows, stressed verticality by emphasizing exterior columns.

Following in his footsteps, Frank Lloyd Wright has continued to the present day to express in his designs the integration of form and function. In the Guggenheim Museum, now under construction in New York City, for example, he calls for a curved building, following the outline of an interior spiral ramp, along the sides of which art will be displayed.

But economic pressure achieved what good example failed to do. Following World War II, construction costs rose and with them rents for office space. A new look at wall design led to reconsideration of the fact that rentable floor area could be increased by making

FIRST OF THE SKYSCRAPERS to have skeleton framing, the Tacoma building, Chicago, had walls in each story supported on iron columns.



EXPRESSIVE OF THE METHOD of support, the facade of Louis Sullivan's Gage Building, Chicago (1899), emphasizes outer columns. Windows are continuous.

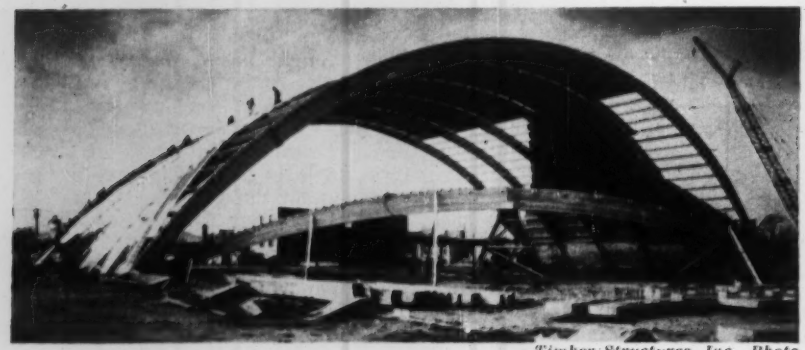
walls thinner, thus increasing rental income. It is also evident that reducing the weight of a wall enables appreciable savings to be made in the structural framing and foundations around the exterior of the building. And about the same period, technological improvements were made in panelwall construction and some slight changes in building-code requirements that encouraged use of thinner walls.

The trend to thin walls for tall buildings received its greatest impetus from the erection of several metal-faced buildings in Pittsburgh—one in aluminum, four in stainless steel—in 1951 and 1952. Thickness of the exterior walls was reduced to about 4 in. and weight dropped to 40 psf.

The panels used for the Pittsburgh buildings were all one-story high, but in 1953 and 1954, the Tishman Realty and Construction Co. tried two-story aluminum panels for two buildings in New York City, with startling success. These buildings, however, all had a backup of concrete 4 in. thick to meet building-code requirements.

In 1954, there was still another breakthrough. The Statler Hotel in Hartford, Conn., was constructed with walls only 1¼ in. thick. These thin panels could not have been used if requirements of the Hartford code had been observed to the letter.

The code is of a type that requires a backup for fire resistance but contains the inconsistency that the exterior may be made only of glass. Taking cognizance of this, the designers first designed the structure with a glass exterior. After this was approved, they



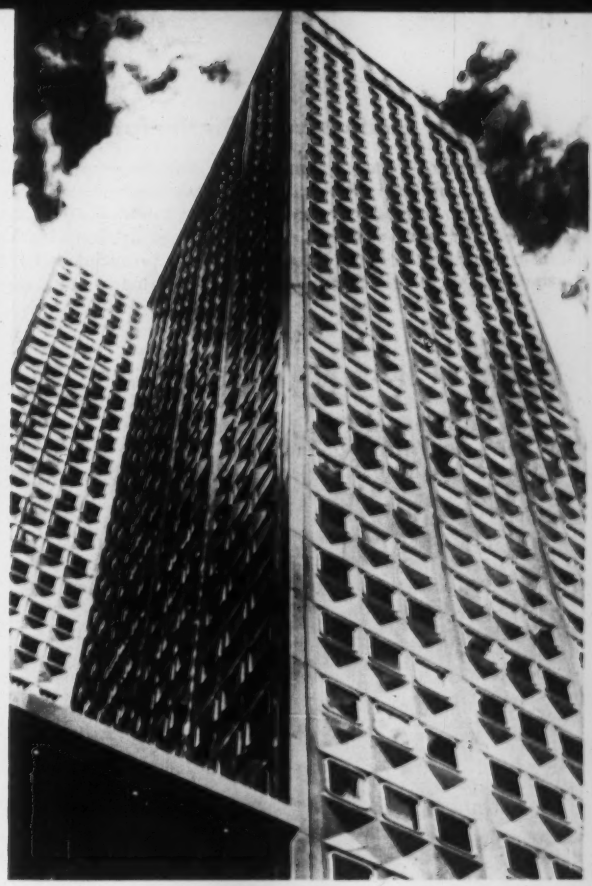
Timber Structures, Inc., Photo

TIMBER set a new arch-span record this year with 250 ft glued-laminated ribs for Island Garden Arena, Hempstead, N. Y. Architects are Frederick T. Bock & Assoc.

STEEL was used to frame the world's largest dome. Spanning 330 ft, the dome caps a

. . . Walls get thinner, weight goes down

GROUP OF INTERRELATED SKYSCRAPERS and low buildings in Rockefeller Center, New York, was designed to maintain a feeling of openness.



TREND TO THIN WALLS for skyscrapers was spurred by the Alcoa Building (above) and other metal-faced buildings erected in Pittsburgh about 1951.

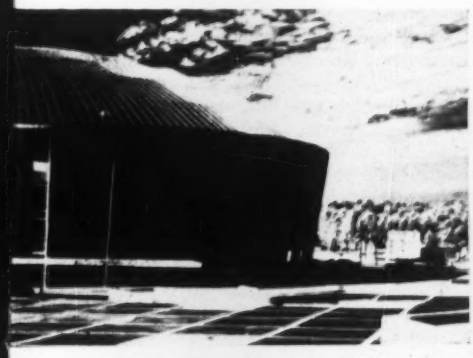
requested and obtained permission to substitute for some of the glass a metal, insulated panel that would have the same fire resistance as wire glass, sufficient strength to carry wind loads, excellent durability, good insulation qualities and ability to keep out rain. The panels approved were installed in aluminum sash, like glass.

Weighing 4.5 psf, the walls are of sandwich construction, with a 1 in. thick glass-fiber insulation core and aluminum-foil vapor seal glued to two facing materials. The interior facing is a flat, ¼ in. asbestos-cement board. The exterior is a laminate of ¼ in. asbestos-cement board and a 20 ga steel sheet with a blue-green porcelain-enameled outer surface. Purpose of this laminate is to eliminate "canning" of the facing.

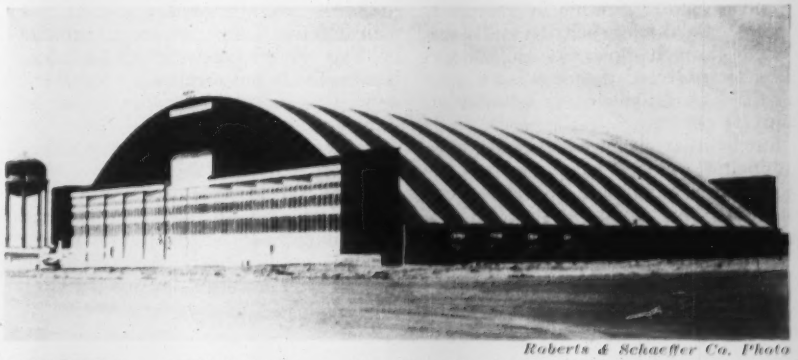
In 1954 also, the 36 story Republic National Bank Building in Dallas, Texas, was constructed with an insulated aluminum wall 1¼ in. thick that weighed only 2 psf, exclusive of glazing.

These examples stimulated additional building-code revisions in many cities and encouraged greater use of thin walls. How much thinner can they get? Well, the 38 story Seagram Building now under construction in New York City has floor-to-ceiling windows, separated by narrow strips of ¼ in. thick bronze! And air-conditioning units at the base of the windows are only 12 in. square.

• **Advances in elevators**—Improvements in elevators kept pace with the upward growth of buildings. By 1868, Otis Bros. had developed a steam passenger elevator with improved safety devices.



municipal auditorium in Charlotte, N. C. Architects were A. G. Odell, Jr. & Assoc.



Roberts & Schaeffer Co. Photo

CONCRETE spans 320 ft in the record-breaking thin-shell roofs of Air Force hangars at Rapid City, S. D. (shown) and Limestone, Me.

. . . The past holds lessons for the future

In 1878, hydraulic elevators came into use for lower buildings. And in 1889, the first successful direct-connected electric elevator was installed in the Demarest Building in New York City.

In the early part of the 20th Century, the direct plunger and gearless tractor were introduced. In 1915, development of micro drive permitted more accurate stops at floor landings. Signal control was provided in 1924, allowing accurate automatic stops from twice the speed possible with manual operation. Finally, automatic control was further improved after World War II by application of electronics and extended to groups of elevators. Human operators and dispatchers became unnecessary.

Factories: On the Way to Automation

In the years following the founding of the AIA, industrial buildings followed several divergent trends.

When transmission of power was mechanical, most industries were located near rivers, so that water would be available for power and manufacturing purposes. But with the advent of electric power, factories were freed to a considerable extent from former restrictions, and many other factors could be considered in site selection. For one thing, manufacturing operations could be carried on in the heart of big cities, close to markets and sources of labor. In fact, with the rise of the skyscraper, the lighter plants were able to go up in the air, as did commercial enterprises and apartments. At the same time, production could be carried out in open country, where land was cheap, where huge, sprawling plants could be built and where there was plenty of room for expansion.

In the mid-19th Century, mill buildings were narrow and enclosed with load-bearing walls. In the interior, closely spaced wood columns supported wood joist floors. Since the bearing walls were relatively immobile and the wood floors were light, shrinkage of the wood columns caused the floors to sag.

Story heights were only about 10 ft, affording little headroom for shafting and belting and little space for ventilation. Windows were small. Stairways were of wood, unenclosed, located inside the building. Or they were incorporated in towers outside, the favorite type being the dangerous spiral form winding around a column.

The main driving belts in mills extended through holes in the floors. These unprotected openings were serious fire hazards, as well as a source of injury to personnel.

Fire-fighting means were inadequate. Automatic sprinklers were unknown, although perforated pipe sprinklers were used in some mills in the 1870's. Some of the larger mills were equipped with hand-operated fire pumps.

Interior environments of those factories were certainly not conducive to maintenance of good health or efficient production. No other ventilation was provided than what could be achieved with open doors and windows. Little provision was made for sanitation in toilet facilities. Artificial lighting was produced by kerosene lamps and was always a fire hazard.

• **Fire resistance improved**—About 1870, a slow-burning type of construction came into use for industrial buildings. It consisted of brick walls, heavy timber floorbeams about 10 ft c-c, heavy floor planking and a hardwood finished surface. The floorbeams spanned 23 ft and were supported on wood columns. Roofs were similarly constructed, but were lighter and pitched about ½ in. per ft, topped with tar and gravel.

In the period between 1874 and 1904, many advances were made in construction, fire protection, safety devices and elimination of hazardous conditions.

Steel became popular for framing, and large spans were achieved in mill buildings with steel trusses. Story heights were increased to 13 to 16 ft. Stairs were enclosed in brick towers and had straight runs, with landings at intermediate levels. Main driving belts were guarded by enclosure in brick towers or races. Openings to stairways and belt towers were closed off with metal doors. Automatic sprinklers were installed. Windows were made larger, improving interior daylighting. And about 1900, use of electric power in factories spread.

By the 1920's, typical industrial buildings were constructed with skeleton framing and curtain walls. Window openings were increased, to occupy from 50% to 70% of the exterior, and with electric lamps improved interior lighting. Development of mass-production methods and mechanical handling, as well as industrial growth, began to influence the layout, overall space requirements, bay sizes, number of stories and story heights of factories.

With World War II came a huge expansion of industrial plant in the U.S. Bigger and better structures were needed—and in a hurry. And the trends carried over to the postwar building boom.

• **Postwar factories**—From the experiences of wartime factory production, industrial management came to realize that good working conditions were as important as tools and machines in achieving maximum production efficiency. Air conditioning, first introduced to improve quality of production, came into more extensive use for worker comfort. Illumination levels were stepped up. In recent years, cafeterias, lockers, rest rooms, parking areas and recreational facilities have almost become necessities.

Demand for more flexible plants spurred employment of longer spans and movable walls. Controlled conditions in the interior encouraged installation of insulated walls and roofs.

Today, many industrial projects cover several acres and consist of many separate buildings. As well as can be estimated, sufficient space is provided for future expansion. Typical factories are one story high, while their office sections are two stories high. Multistory buildings are used where production processes require vertical flow and where ground area is expensive.

In most parts of the country, because of the increased size of machinery, the trend is toward wider column spacing; 50 ft bays are now in general use. Clear height has been increased at least one-third, to about 20 ft, in the last five to ten years, to meet the need for overhead space for handling equipment, piping and ductwork, and better lighting and ventilation.

Because of the need for flexibility, bearing-wall construction is almost never used. If timber construction is called for, the members are generally glued-laminated, for the heavy timbers that were used extensively in the late 19th Century now are scarce. For steel framing, reliance now is placed on wide-flange sections, long-span trusses and open-web joists, which may be connected by rivets, ordinary or high-strength bolts or welding. And concrete may be precast, lift-slab or cast-in-place; ordinary reinforced or prestressed; beam-and-girder, flat slab, folded plate or thin shell.

Curtain walls may be made of any of a wide variety of materials. In recent years, there has been a trend toward sandwich construction, with an insulating core between two facings of attractive, durable materials (concrete,

aluminum, plastics, stainless steel, porcelain-enameled steel). In some plants, with controlled conditions inside, windows are either completely eliminated or are very small. In others, windows may be continuous around the building and extend full height from ground to roof. And sometimes transparent or translucent plastics are substituted for glass.

• **Next automation**—At present, industry appears to be on the brink of a second technological revolution. Automation—completely automatic manufacture, assembly and preparation of products for shipment—now seems mighty close.

What effect will it have on building design? Since a completely pushbutton factory has not yet been built, the answer has to be based on what has succeeded with those nearly fully automated. They indicate that future factories will have to be in line with current trends.

Flexibility in use of space will continue to be a key requirement. The complete enclosure may have to be easily removed to meet changing needs. Column spacing will have to become greater, to allow for increasing size of equipment and so that there will be fewer obstructions to location of machines and material handling equipment. Greater overhead clearance may be necessary, and provision may have to be made for underfloor conveyors. Controlled temperature and humidity will become more essential, to assure accurate performance of the automatic equipment.

TILTUP WALL—One step in applying mass-production techniques to the construction of houses in the field.

Homebuilders Try Mass Production

The type of construction used for individual houses today does not differ greatly from that employed when the AIA was founded. However, construction methods have changed, and relatively cheap gas, fuel oil and electricity and inexpensive appliances have come into widespread use.

• **Mass production**—Prior to World War II, few homebuilders erected more than a dozen houses a year. After the war, large developments became commonplace; some builders stepped up output to more than 3,000 annually. To do this, they adapted, as best they could, industrial mass-production techniques to house construction.

On industrial assembly lines, the workers stand still and perform repetitive operations on parts to be assembled, which pass by on moving platforms or conveyor belts. But in the field, it is not practical to have houses move past stationary workers. Instead, the successful big-project builders set up an assembly line with the workers moving from house to house in successive groups, each of which is assigned a specific task to be repeated in each house.

However, a few prefabricators have been successful in setting up industrial assembly lines in factories for producing housing. But only about 5% of housing constructed annually is turned out by this technique.

• **Every home a palace**—It may truly be said that except for the amount of space in contemporary houses, few of the 19th Century royalty had things so good in their palaces.

Modern houses are sanitary, well ventilated and illuminated; a rapidly increasing number are air conditioned year 'round. The outhouse is becoming a vanishing landmark in the U. S. More than half the houses built last year had 1½ or more bathrooms.

Furnaces for heating the houses are fed fuel automatically. Electric and gas ranges have replaced the coal stove for cooking. Refrigerators and freezers permit food to be stored without spoiling. Automatic dishwashers, clothes-washing machines and dryers take the drudgery out of common tasks.

• **What's next in housing?**—Because house construction has changed so little in the past 100 years, it seems reasonable to expect that substantial advances are still ahead. There appears, for example, to be big opportunities still untapped in factory prefabrication—not necessarily of complete houses, but of major components.

In the relatively near future, therefore, we may expect factory prefabrication of large-size wall and partition panels, perhaps of the type now used for skyscrapers. Piping may be delivered pre-assembled in large sections. And bathrooms and kitchens may come prefabricated in complete units.

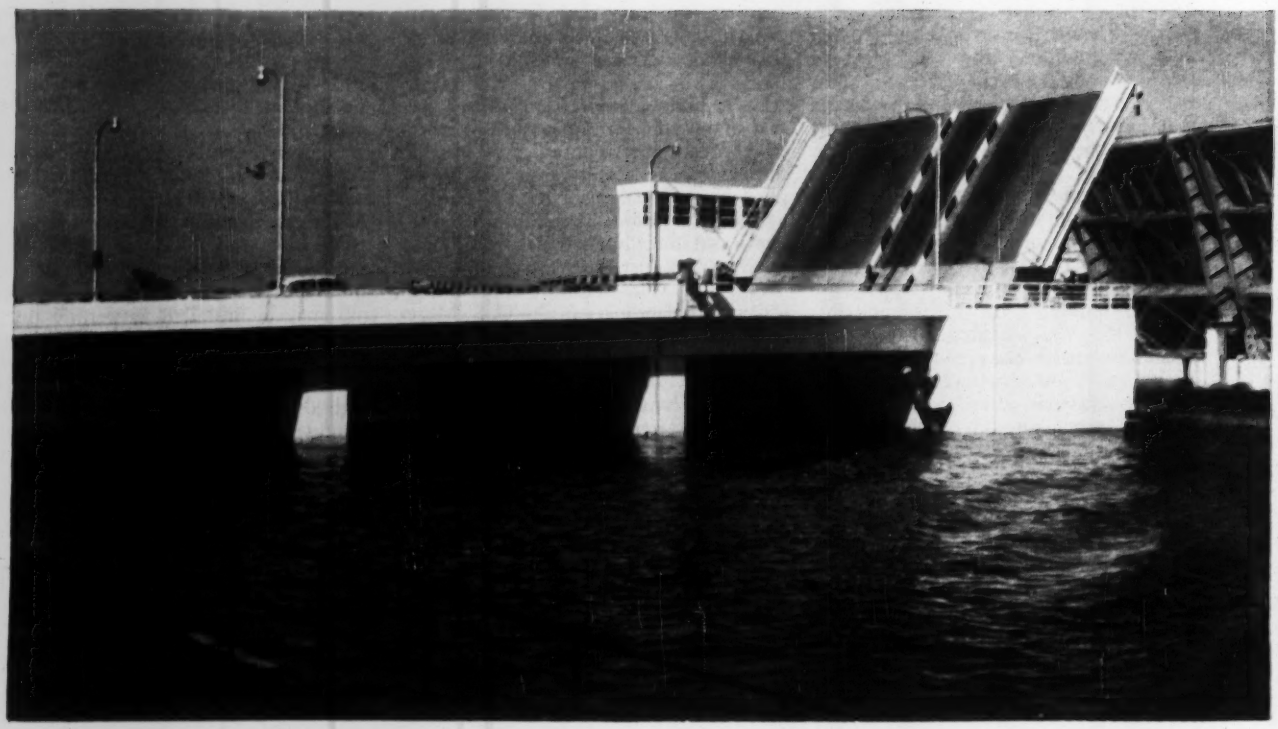
We may also expect more labor-saving devices to be incorporated in the house of the future. Electronic controls may be installed to permit automatic operation of equipment from a distance, perhaps even when the controller is away from the house. New methods of heating food faster, such as induction heating, are now available and may become commonplace.

Equipment may be built into closets for dry cleaning clothes. Provision may be made for retracting furniture into the walls so that space may be used for a variety of purposes. In fact, it may be possible to change room sizes by pushbutton shifting of partitions. And of course, it is reasonable to expect that in the house of tomorrow temperature and humidity will be completely controlled for maximum comfort.

LOW BRIDGE

OPERATING AND MAINTENANCE COSTS WITH WESTINGHOUSE

Westinghouse-powered 63rd Street bridge, Miami, Fla.



A lot of traffic passes through and over the 63rd Street bridge at Miami, Fla. Smooth and rapid operation of the double bascule leaves is a must. Miami also considers it a must to keep operating costs and maintenance at a minimum. Performance and low cost are insured by the all-Westinghouse coordinated electrical system. Power distribution, control system and motors are engineered as a package, to fit the particular requirements of bridge operation. This is an important benefit in the Westinghouse policy of providing specialized know-how to assist bridge planners and contractors.

Consulting engineers: Palmer and Baker, Mobile, Ala. Electrical contractor: Astor Electric Service, Miami, and general contractors: Poston Bridge and Iron Works and George E. Runnel, Inc., Miami. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-94072

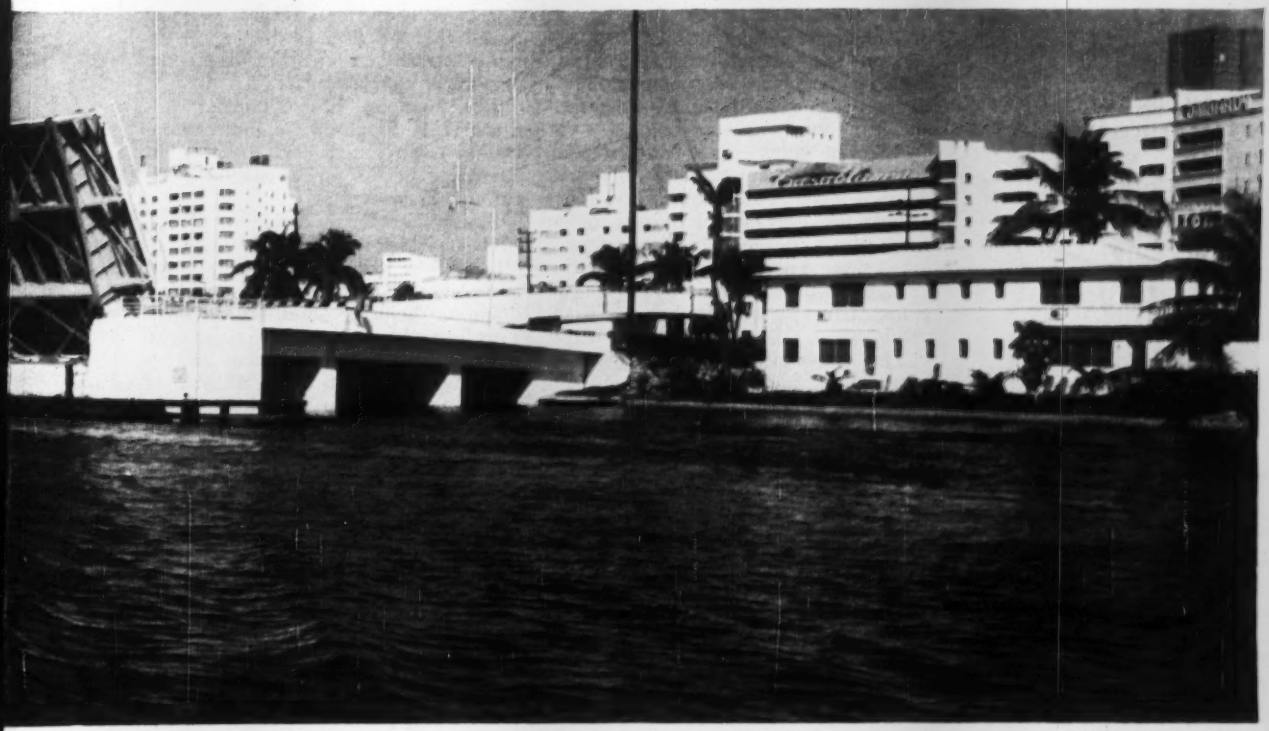
YOU CAN BE SURE...IF IT'S

Westinghouse

(*Top*) Complete control of lock drive, warning signals and barriers on the busy bridge is centralized on this Westinghouse desk.

(*Middle*) Reliable Westinghouse CIP wound rotor motors power the lifting mechanism for each side of the broad 63rd Street bridge. Their operation is coordinated on the Westinghouse control desk.

(*Left*) Westinghouse special bridge type control switchboard.



Modern technology has divided building designers . . .

Pro and Con on Merits of the

Then: *Buildings were simpler and responsibility was limited.*

THE first 100 years of the American Institute of Architects, which was appropriately celebrated last week in Washington, has wrought one change that few architects deny: Professional practice has become much more complicated.

During a century of advancing technology, building design has broadened to embrace such highly involved fields as electric power, electric lighting, central heating, refrigeration, air conditioning, acoustics, and mechanized transportation. For every construction material used in 1857, there are now 10 or 100 or more. Construction techniques have multiplied correspondingly. And the building designer has gradually shouldered many of the legal, business and financial problems of his client.

As a result the architect is no longer the master builder, planning everything and personally directing construction. He has become instead, as one architect puts it, "the coordinator of a team, each member of which handles a particular phase of planning."

The teamwork thesis is supported by the findings of a survey made last year by the AIA Committee on Office Practice. Technical personnel per architectural firm (of more than 2,000 firms that returned questionnaires) averages between 9 and 10 persons. And most of the firms call in outside help for part of their design work, 65% engaging structural consultants, 80% electrical consultants, and 85% mechanical consultants.

An even more closely knit team is evident in the number of firms that don't bring in consultants. These organizations have either principals or employees who undertake the engineering design. The survey showed that in 15% of all firms, at least one principal is licensed as an engineer but not as an architect.

This combination type of company, frequently called architect-engineer, was practically unknown before World War II. But today it is an important and growing segment of the building-design profession.

According to an ENR survey conducted last year, the number of firms calling themselves architects-engineers rose 22% during the period 1953-55 while consulting engineer firms increased only 8% in number and architectural firms dropped off 1%. During the same period, architects-engineers multiplied their dollar volume by 244%, in contrast to increases of only 37% and 19% for consulting engineers and architects, respectively.

These figures do not necessarily show that architects and engineers are lagging behind architects-engineers. They seem to indicate rather that architects and engineers are joining forces to become architects-engineers.

Why? What advantages does the combination have over the traditional separate organizations? Does it turn out a better job? Can it land more jobs? ENR put these and other questions to a cross section of U. S. design firms of all three types—architect, architect-engineer and consulting engineer. And here, for your enlightenment or provocation, are some of their answers:

•

Is the architect-engineer organization the best choice for certain types of work?

All the A-E's think so, and a considerable number of the separate architectural and engineering firms go along.

The more enthusiastic A-E partisans believe the combination is tops for almost any job. In general, however, A-E's do not see themselves in a position of such universal advantage. Most regard the A-E firm as the logical designer of projects involving a preponderance of engineering.

For example, two Cleveland A-E firms, H. K. Ferguson Co. and Dalton-Dalton Associates, believe their biggest advantage occurs on mechanically involved jobs.

Smith, Hinchman & Grylls, of Detroit, express a view held by numerous other A-E's, namely, that the peculiar advantages of A-E firms are most pronounced on large industrial projects. This firm adds further that in the competition for large government jobs, a design organization must be able to offer engineering as well as architectural services. Verne O. McClurg, of McClurg, Shoemaker & McClurg, a Chicago firm that does its own architectural and structural design but engages mechanical and electrical consultants, observes that A-E's and architects handle the same kind of jobs in his area. He adds, however, that the A-E might take on certain engineering studies that would not interest the architect.

The prevailing views of the A-E firms are shared by a number of the straight architectural organizations and consult-

Architect-Engineer

ing engineers interviewed. Adrian Wilson & Associates, Los Angeles architects, believe A-E's are particularly well adapted to undertaking design work for the Defense Department and other federal government agencies. A New Orleans engineer, agreeing that the A-E combination is desirable for government work, adds that the best way to get the required manpower for these jobs is to merge organizations rather than bring in green men.

Ripple & Howe, Denver engineers, see A-E firms as advantageous for large industrial, commercial and public buildings. Neal J. Campbell, St. Louis consulting engineer, believes the combination firm works out to advantage on all types of jobs, but only if there is enough work to keep the full staff busy.

Bradford Clark, of Eggers & Higgins, New York City architects, regards the design of industrial buildings and other projects of routine layout as falling within the province of A-E firms. The combination firm, he says, is essentially an engineering concern; and even in office-building design, the architectural aspect may be routine and secondary to the engineering.

Since so many recently built skyscraper office buildings appear to be alike in layout, the question naturally arises as to whether office-building design is stereotyped. A spokesman for Bien & Bien, New York architects who specialize in office and apartment buildings, answers: "In our practice each building requires specialized and at times unique treatment, although the engineering problems may remain similar."

Others of the noncombined designers see no advantages in the A-E combination. Peter F. Loftus Corp., Pittsburgh engineers, believes any facility of the A-E combination can be equaled by an architectural firm in consultation with an engineering firm. Kellogg & Sayre Associated Architects, of Denver, doubt that the combination has any advantages. It might be desirable for simplified construction or repetitive work, they say, but if the client wants imaginative work, he should start with an architect.

•

Is the A-E combination an asset for getting new jobs?

"Yes," chorus the architects-engineers. "Maybe sometimes," admit the separates.

Lockwood-Greene Engineers, Inc., New York combination firm, figures that clients go for the A-E because he makes what he sells. Owners are coming to realize, says the Lockwood-Greene spokesman, that in commissioning a building design, they are buying a great deal more service than the purely architectural.

Donald Beach Kirby & Associates, San Francisco architect whose organization does its own structural engineering, thinks big clients are glad to let an A-E relieve them of all detail. A combination design firm in New Orleans holds the general affirmative view of the A-E's on this question but sounds a negative concerning small jobs. In the latter respect, a similar opinion is voiced by Kellogg & Sayre.

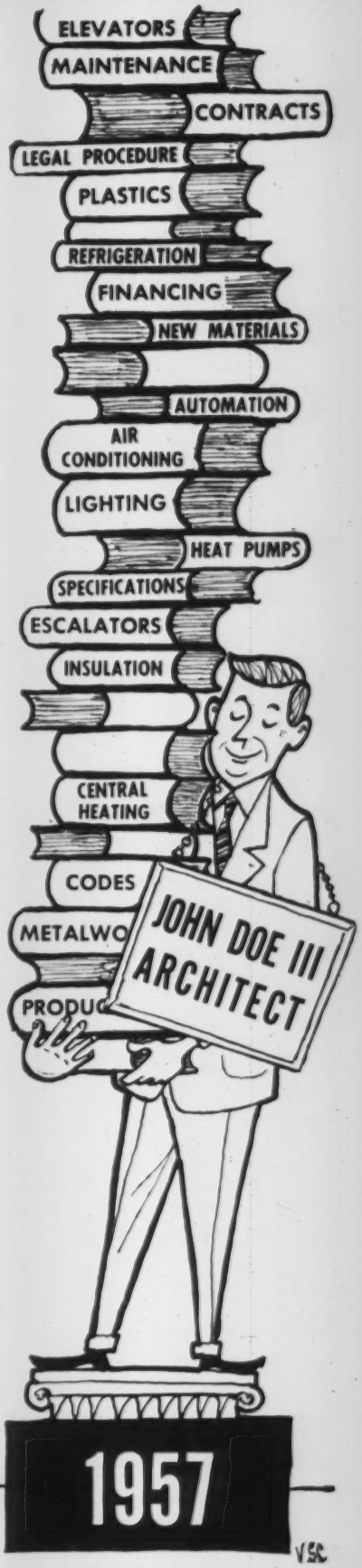
Thomas D. Broad, speaking for Broad & Nelson, Dallas architects, feels that the combination design organization might have an edge in landing industrial jobs and projects involving the development of whole areas. He also suggests that the A-E label itself might be a good sales point, even where a combination has no real functional advantage. Stating a similar opinion, a Seattle A-E says the combination sounds sensible to business firms that themselves offer a variety of services. Reflecting the same view, a San Francisco architect suspects that a number of his fellows call themselves A-E's just to make good-looking letterheads.

None of the consulting engineers queried answered "yes" in reply to this question. However, one conceded that "on occasion" an A-E might have an edge.

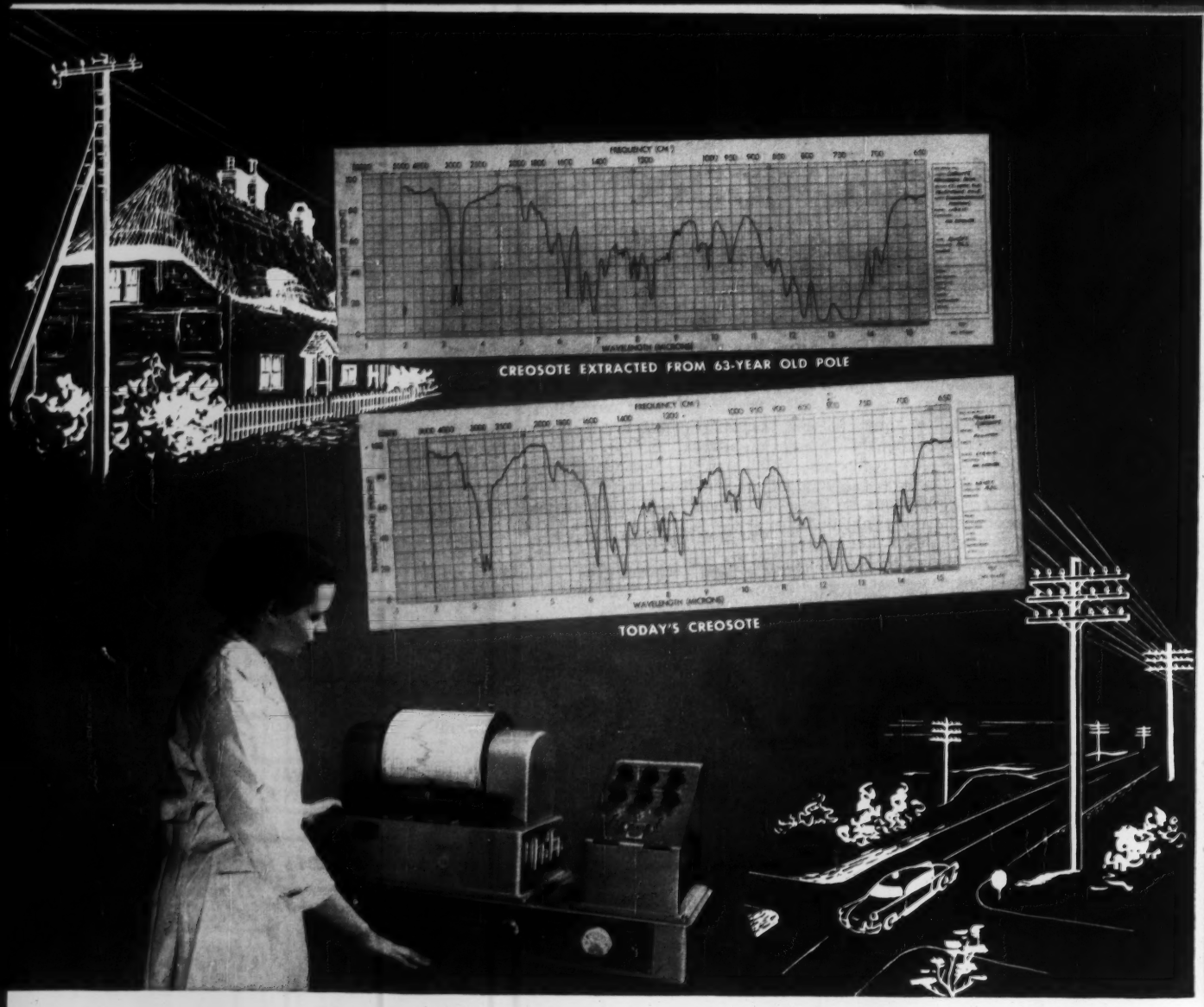
A Seattle consulting engineer declared that if he were a client he would

Estimated Personnel in Architectural Firms

No. of firms	Persons per firm	No. of firms	Persons per firm
4466	1	41	60
693	2	32	80
900	3	23	100
850	4	14	150
700	6	11	200
570	8	9	250
530	10	7	300
364	15	7	350
340	20	4	400
114	30	4	450
80	40	4	500
45	50	2	550



Now: *Buildings design is a multitude of highly specialized tasks.*



CREOSOTE

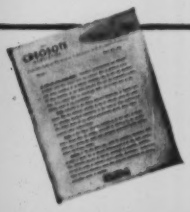
. . . the modern preservative with a proved record

Secrets of 63-year pole life unlocked in laboratory

The 63-year old English telephone pole which Koppers Tar Products Division representatives brought to this country recently was an outstanding example of the long service which only pressure-creosoted wood can document. Intensive laboratory investigations have been conducted on this pole to determine, among other properties, its retention of preservative and the chemical composition of the creosote used in its treatment.

Preliminary findings are now available . . . and infra-red spectrophotometer comparisons of modern creosote with creosote extracted from the old pole tell a dramatic story! As you will note from the spectra in our illustration, the creosote which protected this Scots pine pole for 63 years is practically identical with today's creosote.

One conclusion is obvious: the creosote treatment you specify for your wood investment today will give the same long life as that typified by the 63-year record of the English pole. What better evidence that creosote is, truly, the 50-year-plus preservative.



To keep abreast of news on wood preservation, you'll want to receive these periodical reports on Creosote. Just drop us a note and we'll put you on the mailing list.

KOPPERS

CREOSOTE

TAR PRODUCTS DIVISION

Pittsburgh 19, Pa.

. . . To some, expansion and success seem incompatible

be much more impressed by a designer who could tap the engineering talent in several firms than by one who had to use the engineers on the payroll.

Neal J. Campbell, St. Louis consulting engineer, figures that other things are more important than the type of organizational setup. "The only way to get a new job," Mr. Campbell states, "is to have done a very satisfactory job before."

•

Does the designer-client relationship tend to get lost in the large departmentalized organization?

In general, the small organizations answer "yes," and the large ones say it isn't so. Many of the latter concede, however, that it is a risk and must be overcome by proper organization and skillful control.

N. J. Schlossman, of the Chicago architectural firm of Loebl, Schlossman & Bennett, feels sure that there is a risk of losing touch in the big companies. He pictures, for example, the initial contact with the client being made by some one in the top echelon of a large company and then the day-to-day contact being maintained by someone at a lower level.

Thomas Broad, whose staff averages about 16, thinks the answer must be "yes," but he sees counterbalancing advantages in a firm large enough to require departmentalization.

The designer-client relationship is actually closer if the design organization is big, according to A. L. Ward, spokesman for Welton Becket & Associates, Los Angeles architects. He says that in the Becket organization, which does its own mechanical and electrical design, the various department heads are specialists to a degree that would be impossible in a smaller firm.

Lucien Caste, a Pittsburgh architect with a staff of five, takes the stand of the big companies: "I see no reason why there should be any lost relationship," he says, "as long as the project manager is competent."

The project-manager system, under which one man from the design firm is the contact with a client from start to finish of a particular job, is mentioned by a number of big firms as the answer to the threat of losing contact. One firm, employing upwards of 200 people, assigns one of its six partners to each client.

The project-manager system no doubt results in a close enough relationship between project manager and client, opines Architect Charles H. Kellogg, but may relegate the actual designer of a building to a background role.

•

Which type of firm, architect or architect-engineer, has greater growth potential in size, dollar volume and work variety?

With only spotted dissent, the firms questioned agree that the A-E's have the edge in size and dollar volume potential. There is considerable disagreement, however, regarding work variety.

A-E's will grow bigger and do heavier volumes because they can go after jobs that architects can't, say some. According to a spokesman for Sverdrup & Parcel, St. Louis A-E's, "The architect-engineer can do engineering jobs when the architect would never get them."

Lucian Caste credits the growth potential of architects-engineers partly to the fact that, having their own engineering personnel, they don't have to compete for the services of consulting engineers.

Echoing this sentiment, a spokesman for a Seattle A-E firm observes that architects who call in consultants sometimes have to stand in line when the latter have heavy work loads. This naturally limits the amount of work the architect can handle.

Growth might produce an A-E firm, according to Ivan Smith, a partner in Reynolds, Smith & Hills, architect-engineers, of Jacksonville, Fla. As architectural firms get larger, he points out, they tend to take in engineers to round out their services.

Another factor favoring more rapid growth of the A-E firm, according to Verne McClurg, is its ability to diversify. This opinion is supported by the Welton Becket spokesman.

Standing in the middle on this question, N. J. Schlossman sees no practical limit for either type of firm with regard to any of the three categories of growth. A sprinkling of other designers also consider the type of organization as having no effect on growth. One believes the architectural office has greater potential for dollar volume but not for growth in size of organization.

A spokesman for Howell Lewis Shay & Associates, Philadelphia A-E's, thinks that both volume and size expansion depend on the creative design concepts of the architectural head or chief designer and on the sales ability of the organization, regardless of whether the firm is purely architectural or combined. But for variety of work, he believes A-E's have more growth potential. The latter opinion is directly contrary to the belief of Charles M. Nes, Jr., of the Baltimore architectural firm of Fisher, Nes, Campbell & Associates. Mr. Nes feels that the architectural firm has more potential for variety because it is better able to adapt manpower to general construction activities.

Although the variety-of-work question raised considerable difference of opinion, none of it was among the combination firms; those questioned are unanimous in the belief that their type of organization offers more opportunity to expand into varied kinds of work.

Giffels & Vallet, L. Rosetti, Detroit A-E firm, is quite emphatic on the variety question, stating that its designers do everything but small residences. Recent work, a spokesman said, includes nuclear plants, schools, cement and glass factories, a foundry, racetrack, convent, clinic, and department store.

•

Are you interested in expansion?

The ayes have a slight edge here, but there are numerous no and maybe answers, plus some interesting comments. Particularly notable is the fact that a number of firms that would prefer not to expand have been forced to do so by the pressure of work.

Typical of these is Fisher, Nes, Campbell & Associates, employing about 30 architects. The ideal, in the opinion of Charles Nes, would be a 10 man office in which everybody works on the same project.

Also in this category is the firm of Broad & Nelson, whose spokesman, Thomas Broad, believes "there is a false ambition (which is general in the U. S. A.) to become bigger regardless." When a firm gets large, the tendency is to become a production line, says Mr. Broad, rather than a personal expression of the architects, which the practice of architecture should be.

The personal-touch angle was mentioned by several architects. Joseph Wigmore, of Philadelphia, declared that he could triple the size of his organization but doesn't want to. He declared, "I want to deal personally with all my clients."

The answers of several firms are implicit in their replies to the earlier question about designer-client relationship. Loebl, Schlossman & Bennett, for example, want to take on all the work they can handle but don't want to expand to the point of impersonalizing the services rendered. Welton Becket & Associates would like to expand as a means of further sharpening their departmental specialization.

TRUSCON FERROBORD®

Truscon Ferrobord Steeldeck is being placed in position, then welded directly to Truscon "O-T" Steel Joists at Pick-N-Pay Division of Cook Coffee Company, Maple Heights, Ohio. B & B Construction Company, Youngstown, Ohio, architects and contractors.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

STEELDECK

TRUSCON "O-T"® STEEL JOISTS offer predictable and dependable load-bearing capacity. Every Truscon "O-T" Joist—shortspan series—is quality protected. Each is backed by the Steel Joist Institute Seal of Approval. Be safe . . . avoid inferior quality. Specify approved Truscon "O-T" Steel Joists. Send coupon for design data.

THE BEST COSTS LESS INSTALLED. That's the story of Republic ELECTRUNITE® E.M.T.—the original lightweight, rigid steel electrical raceway. "INCH-MARKED"® and "GUIDE-LINED" for accurate measuring and bending. Threadless—every connection is a union—no long lines to turn. Approved by National Electrical Code for exposed, concealed and concrete installation. Sold through electrical distributors everywhere.

NEW BUILDINGS MEAN PARKING. Truscon Steel Curb Bars offer long-time protection against damage to parking dividers, islands, curbs. Quickly placed in the form, they grip concrete rigidly, take the bumps, protect edges and corners. It's low-cost insurance for all vulnerable concrete areas. Send coupon for details and specifications.

STEEL

and Steel Products

Gets your building under roof fast.

Ferrobord is long. Ferrobord is light. It's the steel decking that roofs large areas quickly—either flat, pitched or curved.

Long lengths—up to 32 feet—span three or more purlin spacings. Its light weight makes it easy to handle, easy to place. Erection is from above. Each member is welded or clipped to supporting Truscon "O-T" Steel Joists.

Load-bearing capacity is predictable and dependable. Performance can be calculated by means of accepted engineering principles. Each unit firmly *interlocks* with adjoining unit along its entire length. Result: maximum in lateral distribution of concentrated loadings. The completed deck may be considered as a continuous beam rather than a simply supported beam, with a consequent 25% increase in carrying capacity.

When laid, Ferrobord's smooth surface is ready for insulation, built-up roofing and waterproofing. You have a roof that is light, strong, fire-resistant. Send coupon below for design information.

REPUBLIC STEEL CORPORATION
Dept. C-3266
3114 East 45th Street, Cleveland 27, Ohio

Please send me more specifications describing:

- ☐ Truscon Ferrobord Steeldeck
- ☐ Truscon Steel Curb Bars
- ☐ Truscon "O-T" Steel Joists
- ☐ Republic ELECTRUNITE E.M.T.

Name_____ Title_____

Firm_____

Address_____

City_____ Zone____ State_____

. . . The combination firms are more expansion minded

A spokesman for Bonnett & Brandt, Baltimore A-E firm, says his firm does not want to expand. "Expansion," he stated, "has a tendency to remove the principals from the design and creative aspects of the work, at which they excel, and make them into executives, at which they might or might not excel."

Hellmuth, Obata & Kassabaum, Inc., St. Louis architects, want to expand by adding engineers. With some mechanical engineers already, they want more, plus some structural designers.

Numerous firms appraise the question of expansion from a purely business standpoint. By no means, however, do they all arrive at similar conclusions. Some are eager to expand, others are definite in their wish not to do so.

Architect-engineer firms are more expansion-minded as a group than either the architects or engineers separately. A Cleveland A-E wants to expand "to make more money." A St. Louis A-E is interested "if profitable." A Philadelphia A-E wants to grow to a point where further growth is not profitable. A New York A-E wants to grow gradually, but not for a single job. A West Coast A-E wants to grow as the work load requires. A New Orleans architect would like to expand so that he can handle more and bigger jobs.

On the other side, a Seattle architect says, "The more you expand, the more your overhead goes up, eating up the profits." A Denver architect doesn't want to grow; he likes the way his staff operates now. A Florida A-E figures he has reached the size limit justified by the work volume in his area. A Denver engineering firm, which found itself expansively overstaffed last year after a temporary rush subsided, would prefer in the future to use other consultants rather than expand.

•

How large should an architect-engineer firm be to operate effectively?

A very interesting aspect of the replies to this question is that the bigger firms do not, in general, consider bigness necessary for effectiveness. Not everybody agrees though.

H. K. Ferguson Co., with about 800 engineers on the payroll, figures that an A-E organization "should have at least two persons." A West Coast A-E, with a staff of 250, replies: "Just large enough to have one good man in each field of architecture and engineering." Lockwood Greene, employing about 175 professional people, thinks 15 to 20 architects and engineers can make an effective team. Adrian Wilson & Associates, with a staff of 250, figures that the A-E firm must make enough money for two at least.

A Cleveland consulting engineer firm, Havens & Emerson, which employs 48, also subscribes to this view. "Frankly, about two," is the answer of the H & E spokesman, who adds that efficiency drops as the organization grows larger.

At the other end of the scale is a West Coast architect, with about 75 people, who thinks an A-E firm needs a staff of 150. A spokesman for Sverdrup and Parcel, a firm with nearly 500 employees, not counting its highway-engineering subsidiary, says: "Obviously it can't be less than 50 people to get the necessary talents."

A New Orleans A-E with a staff of 20 differs: "Twenty-five men make a very efficient organization."

"Probably need a minimum of 60," speculates the Ripple & Howe representative.

"Thirty-five is as many as you can put in," maintains engineer Neal J. Campbell.

"Upward of 25 or 30," suggests architect Thomas D. Broad, adding the belief that smaller firms would do better to engage outside consulting engineers.

Then there is a large group that figures you can't pin down the effective size of an A-E firm, not even loosely, as an independent quantity.

"How much business have they got?" countered a New Orleans A-E.

"Size has no bearing," says Verne McClurg.

"Depends on the scope of their activities," maintains Walter J. Parks, Jr., Jacksonville, Fla., engineer.

"Depends entirely upon the administrative organization, personnel," declares Arthur Weers, of the Denver A-E firm, Harbert, Gillum, Whittlesey, Weers & Leffler.

"I wish I knew," replied a representative of a Pennsylvania A-E who employs 800 persons.

Depends on the amount of work, says a spokesman for an East Coast A-E, who employed a force of 900 during the war and now has upwards of 200. He supplemented his comment with a rule-of-thumb ratio: one technical employee to each $250-500,000 worth of construction work per year.

•

Does an architectural firm that engages consulting engineers give higher quality design service than an A-E firm?

Although less than half the answers to this question stray off neutral ground, the remainder show a sharp division of opinion, with the non-combined firms arrayed opposite the A-E's.

N. J. Schlossman speaks for a firm that has worked both ways. In the past, Loebl, Schlossman & Bennett have had mechanical, structural and electrical engineers on the staff. Now, however, they engage consultants for specific jobs. "We believe it costs us more," declares Mr. Schlossman, "but we firmly believe it enables us to render better service to the client."

Several architects express a belief that better work results from picking a consultant qualified for a particular job. "It stands to reason," argues a Seattle architect, "that a firm of consulting engineers can select and keep better talent than we can."

The spokesman for a West Coast A-E with about 250 people on the payroll takes the opposite view. "When the lift-slab method was developed," he said, illustrating how his organization stays abreast of new techniques, "we flew several of our engineers to the first job to study how it was done."

Coordination is better in the combination firm too, reports the A-E spokesman just quoted. "There's always a struggle between the structural engineer, who tries to minimize cost by keeping cubage low, and the mechanical engineer, who wants room for his ducts. In our office, they work side by side, solving the space problems together."

One A-E concedes that an architect might produce a design with a better appearance. Stated another: "If the esthetics of the facade are important, we can employ a consulting architect."

A Western consulting engineer thinks that a large A-E firm would probably turn out a better job. He would be skeptical, however, of the small firm.

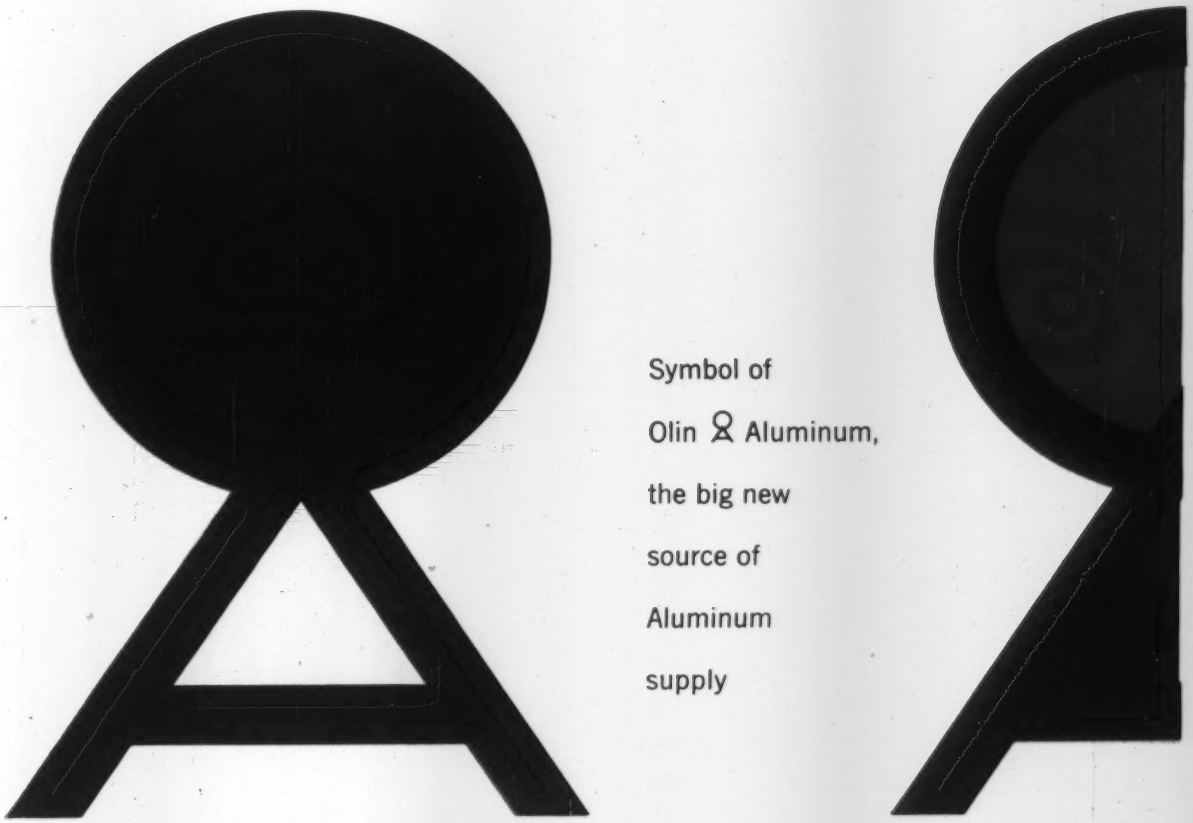
•

Who designs for the smaller fee, the A-E or the architect who calls in outside consulting engineers?

Nobody seems enthusiastic about getting into this subject. And, in fact, a considerable number decline to answer. Most of the others believe that the type of organization has no effect on fee.

It isn't unanimous though. Three big A-E's say that they think the A-E can do a job for less money. And a fourth, who thinks the fees would be about the same, feels that the A-E gives more service.

Most frequently cited reason for the majority view is that competition keeps fees well evened regardless of the type of organization.



Symbol of
Olin Aluminum,
the big new
source of
Aluminum
supply

OLIN ALUMINUM brings you an important new concept of

Quality and Service designed to cut your manufacturing costs

Olin Aluminum is already being produced at four locations. Soon, backed by a multi-million dollar investment and the extensive experience of Olin Mathieson Chemical Corporation in the non-ferrous metals field—Olin Aluminum's new, ultra-modern facilities will be ready to produce an initial annual volume of more than 240 million pounds of fine Aluminum.

The full integration of these new facilities—complete from ore ships to Alumina Plant, Reduction Plant, Rolling Mills and Extrusion Plants—will assure dependable delivery of Olin Aluminum to you. And the advanced technology and design of these facilities plus the experienced skill of the men who will operate them will mean competitively superior metallurgical quality, tolerances and finish for every user of Olin Aluminum.

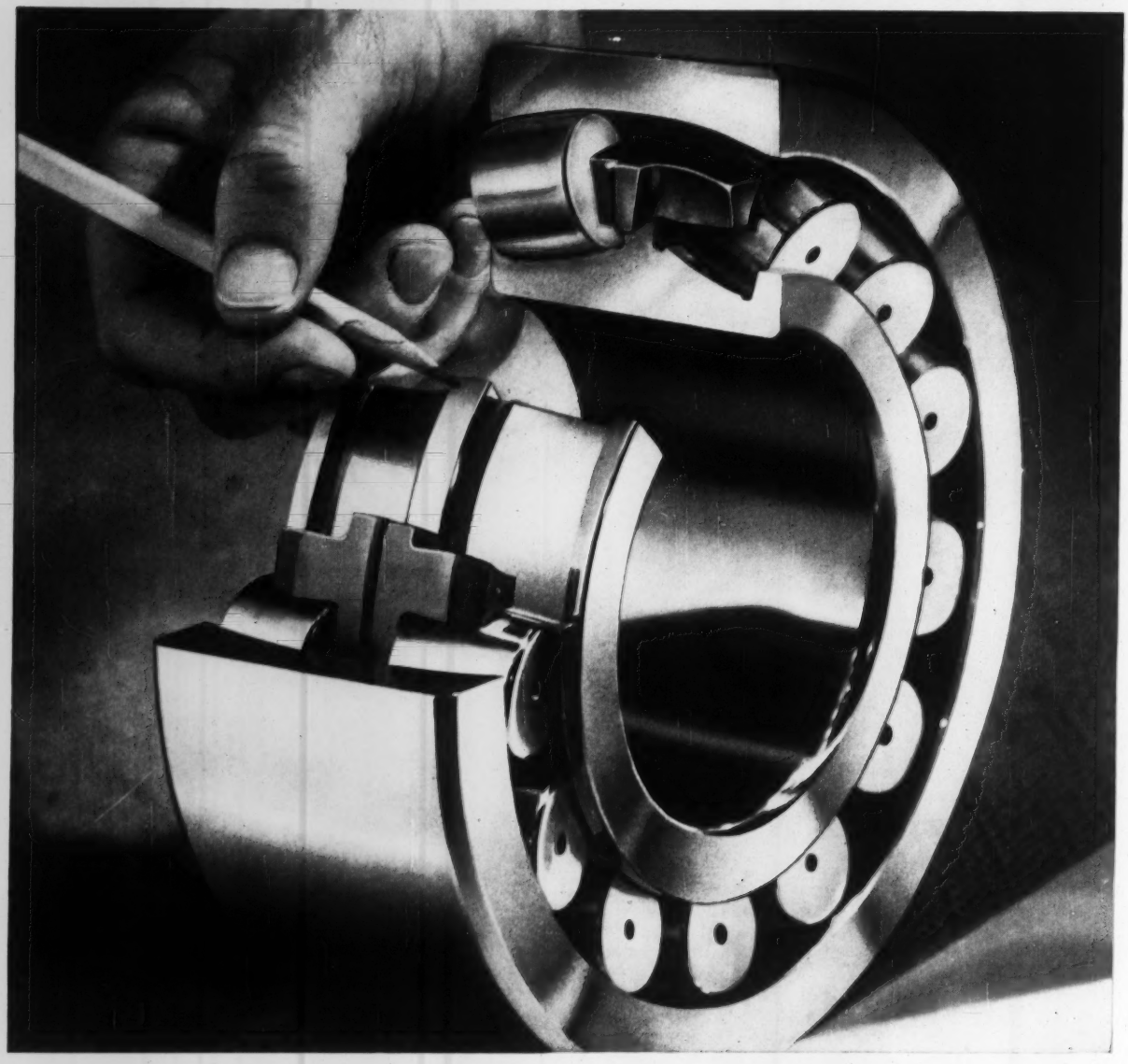
That is Olin Aluminum's new concept of Quality and Service: fine Custom-Made Aluminum so tailored to your individual needs that it will save you manufacturing operations...delivery and service so dependable that costly delays will be eliminated...and technical assistance so thorough and imaginative that it will assure you maximum economic use of every ounce of Aluminum.

The men from Olin Aluminum are already making calls on Industry. Soon they will be coming your way. Meanwhile, we cordially invite your inquiries. Write to: Aluminum Division-Sales, Olin Mathieson Chemical Corporation, 460 Park Avenue, New York, 22, N. Y.

OLIN ALUMINUM

AND OLIN ALUMINUM ARE TRADEMARKS. COPYRIGHT 1957, OLIN MATHIESON CHEMICAL CORPORATION

TORRINGTON *SPHERICAL ROLLER* BEARINGS



"This flange guides the rollers to peak performance!"

The center flange on the inner raceway of the TORRINGTON Spherical Roller Bearing positions the rollers to handle thrust loads. This accurate positioning also assures radial stability of the rollers under heavy loads—even at continuous high speeds and under conditions of misalignment.

This superior design feature is only one of many advantages you get when you specify TORRINGTON. For example, you get the service of TORRINGTON'S experienced engineers, who will help you with design and maintenance problems—or design custom bearings for special applications.

For long, low-maintenance service in heavy-duty applications, order TORRINGTON Spherical Roller Bearings. They're available from stock with either straight or tapered bore, for shaft or adapter mounting.

THE TORRINGTON COMPANY
South Bend 21, Ind. • Torrington, Conn.
District offices and distributors in principal cities of United States and Canada

TORRINGTON BEARINGS

Spherical Roller • Tapered Roller • Cylindrical Roller
Needle • Ball • Needle Rollers

El Centro is served by strikingly modern 15 mgd filter works . . .

Water Plant Features Automatic Control

The thirstiest city in the U.S.—at least in the summertime—is now served by a 15 mgd water treatment plant that incorporates a high degree of automatic control. Although containing little of unique nature, the sum of the parts is a striking example of modern small plant design.

The city is El Centro, population 18,000, located in the rain-starved Imperial Valley of southern California. Without any assist from industry, El Centrans consume almost 600 gal per capita per day during hot summer months.

This thirst is now satisfied by a new high rate filtration plant (nominal 3.75 gpm per sq ft of filter area) that operates automatically through high service pumping except for manual filling of chemical bins and filter backwashing. The plant was completed six months ago at a cost of $1,450,000 including high lift pumps, land and engineering. Breakdown cost of the filter plant, including high service pumping but excluding filtered water storage, was $654,000, or $43,500 per mgd at the 3.75 gpm filtration rate.

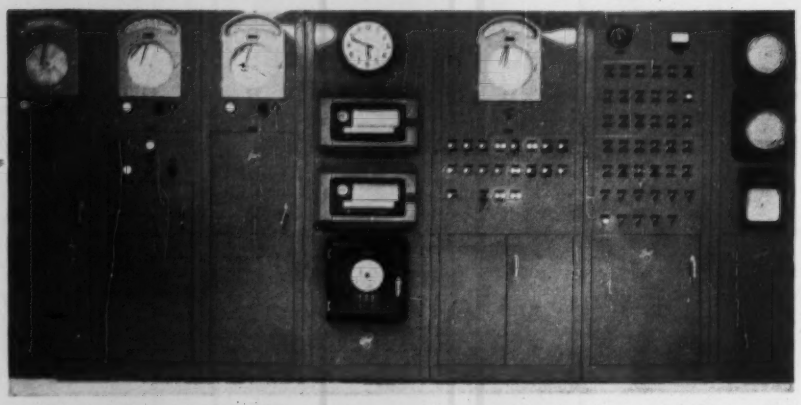
Raw water, drawn from the Colorado River through 100 miles of the All-American Canal, is delivered from either of two local irrigation canals into an intake sump where it is pumped into two 35 mg raw water basins. Water flows by gravity through a 36 in. butterfly valve into a 16.5 mgd solids contact clarifier, then into rapid sand filters, through filter rate controllers which are pneumatically operated butterfly valves that double as effluent valves and into a small clearwell. Three vertical propeller pumps at the end of the clearwell transfer finished water into 5 mg of storage reservoirs where four horizontal centrifugal pumps, of 18 mgd capacity, move water 1¼ mi to a 250,000 gal elevated tank in the distribution system.

• **Automatic controls**—Each high service pump is equipped with an automatic check valve, a 12 in. pneumatically operated butterfly valve controlled through a pressure-operated pilot. Water level in each tank, sump or basin is measured by bubblers which actuate pneumatic indicating instruments and control the various pumping programs. Filter rate-of-flow controllers operate by controlled air pressure transmitted by a differential converter. The clarifier influent valve is actuated by a float controller.

Plant control cycles are as follows. When city demand is unsatisfied, a float-operated transmitter located in the elevated water tank telemeters the water level to the plant via leased telephone lines. This signal actuates a program controller which operates the four high service pumps on a 7 step pump-up program to supply the demand. Resulting water level drop in the finished water tanks allows the clearwell transfer pumps to start on a pump-down program. Water level drop here restores the plant pilot control circuit which allows rate of flow controllers and clarifier influent valve to open. The filter controllers modulate to keep finished water tank full at all times. Low lift pumps are not integrated in the plant cycle since the raw water basin feeds the rest of the plant by gravity. They operate on a stepless program governed by the basin level.

• **Shutdown sequence**—When city demand is satisfied, rising water level in the remote elevated tank shuts down the high service pumps in sequence. Consequent level rise in the finished water tanks causes rate of flow controllers to gradually reduce their flow to about 20% of capacity. When these

. . . Only chemicals backwashing are manual



CENTRAL CONTROL PANEL includes recording loss of head and rate of flow gages for individual filters, comprehensive set of alarms.

tanks are completely full, a highwater cutoff shuts down the clearwell transfer pumps. Clearwell level continues to rise from the reduced filter flow until full when the high water cutoff deenergizes the plant pilot circuit, cutting off the rate of flow controllers and clarifier influent valve. The open pilot circuit also cuts off chemical feeders and influent chlorinators. These are proportioned by a propeller meter at the inlet to the clarifier.

Clarifier sludge is removed automatically via controlled diaphragm blowoff valves which discharge into an adjacent sump where pumps move the sludge into dewatering basins. (Nothing but finished water can leave the plant; supernatant is pumped back into the raw water basins).

A centralized control room contains a main control panel which includes all the control equipment normally scattered throughout a plant. Even the recording loss of head and rate of flow gages for each filter have been located in the panel instead of at the operating tables. Also included in the panel is a comprehensive system of alarms, including signals for a preset head loss through the filters to indicate when backwashing is required and when chlorine residuals vary beyond adjustable set limits.

• **Clever design**—Reversal of the usual order of low lift pumps and raw water basins was due to a local foundation condition that precluded excavation below 5 or 6 ft. Rather than a large shallow basin, the engineers found it some $180,000 cheaper to construct the basin 16 ft deep, 5 ft in the ground and 11 ft above, utilizing excavation in the embankment. Basin water level was thus above the supply canal, forcing location of the pumps ahead of the raw water basins.

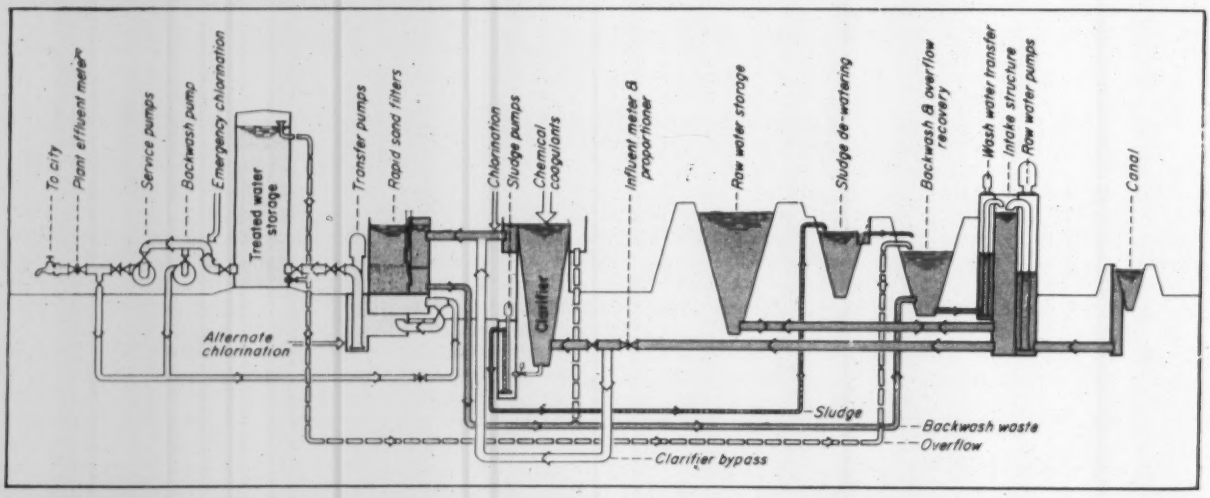
Four vertical propeller pumps, of 2,000 to 6,000 gpm capacities, are located in an intake structure. One of the pump drives is the variable speed magnetic type; all pumps are controlled in a stepless program from 2,700 to 16,700 gpm to maintain elevation in the sump within 6 in., and thus always sufficiently below canal delivery elevation so that the supplier, a local irrigation district, can measure raw water through a standard delivery gate.

Stacking the pumps ahead of the basin introduces no additional pumping head since it is necessary in any case to pump into the clarifier and filters. And because the basins run through the plant by gravity, a degree of protection is provided against total low lift pump outage. Whenever canal water is not available the low lift pumps can move basin water into the plant.

Because of a seasonal zoogleal slime in the raw water, which could not be removed by ordinary sedimentation and if not removed would penetrate the filter sand, the upflow solids contact type clarifier was chosen. It is an 86 ft dia concrete tank of nominal 16.5 mgd capacity at a 2½ gpm per sq ft overflow rate. Raw water averages 10 ppm in turbidity occasionally running as high as 50 ppm. Total hardness is 320 ppm; pH = 8.5.

• **High rate filters**—Each of six filter bays is 13 x 36 ft, containing 4 in. perforated asbestos-cement pipe underdrains on 12 in. centers across the narrow dimension, 14 in. of 1½ to ⅛ in. graded gravel, 4 in. of coarse sand (1 mm) and 20 in. of fine sand (0.55 to 0.60 mm). Design was based on the high rate experiments of John Baylis, purification engineer with Chicago's Bureau of Water, and will permit 4½ gpm per sq ft rates. However, nominal design capacity of the plant is 3.75 gpm per sq ft. Filters are equipped with rotating surface wash arms.

Wash water troughs are of prestressed glass fiber ¼-in. thick. Sections are 17



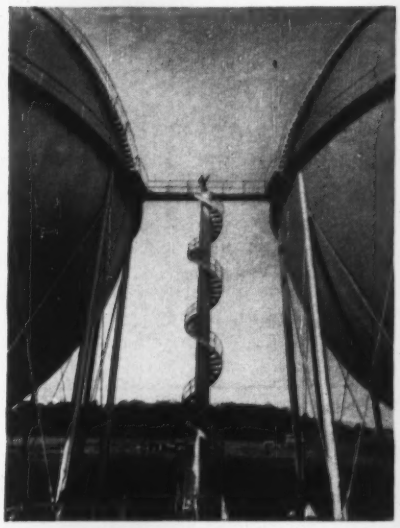
FLOW DIAGRAM through El Centro plant. Raw water pumps are used ahead of raw water basins due to local foundation condition.

IN TOKYO, JAPAN

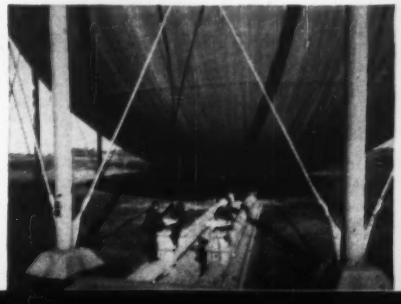
WORLD'S LARGEST USS "T-1" STEEL PRESSURE VESSELS

Beyond the Shinto shrine are the two USS "T-1" Steel spheres. They are being used by Tokyo Gas Works, Ltd., for the storage of natural gas at a pressure of 71.1 psi.

Lightweight construction—made possible by USS "T-1" Steel—cut shipping, handling and erection costs of these giant pressure vessels.



Thinner walls meant less weld metal required, less erection time needed. Lightweight construction also reduced amount and expense of foundation.



COMPARED TO CARBON STEEL CONSTRUCTION, the use of USS "T-1" Steel saved 1,720 tons of steel in the two giant pressure vessels pictured here. Having a diameter of 110.5 ft. each, they are the largest Hortonspheres ever built for the storage of gas. USS "T-1" Steel enabled Chicago Bridge & Iron Company to use 0.73-inch-thick shell plates rather than mild steel plates 1.75 inches thick.

USS "T-1" Steel's very high yield strength (90,000 psi minimum), plus previous experience in building non-code government vessels, permitted use of a maximum allowable working stress of 36,000 psi to which a 90% weld joint efficiency was applied. With the exception of the working stress values, the vessels were built to the ASME Code for Unfired Pressure Vessels where applicable.

In addition to saving 1,720 tons of steel, the thinner USS "T-1" Steel plates drastically lowered the cost of shipping to Japan. And each ton saved meant lower erection, welding and foundation costs. Added up, all these savings point out why the use of USS "T-1" Steel spells economy.

Shell plates were fabricated at CB&I's Greenville, Pa. plant and shipped to Tokyo for field erection. Field welding was done with E 12016 electrodes and did not require stress relief. All welds were 100% X-rayed.

Two additional vessels of similar design, but smaller in size, are now being fabricated by Chicago Bridge & Iron for installation in Tokyo.

USS "T-1" Steel is being used to improve performance and reduce costs in a wide variety of applications in steel mills, in mining equipment, in construction equipment, in materials handling equipment, in bridges, and even in steam turbines. Write for complete information about its application and fabrication. United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS "T-1" CONSTRUCTIONAL ALLOY STEEL

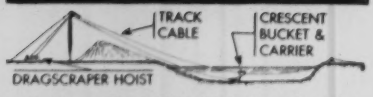
"USS" and "T-1" are registered trademarks.

UNITED STATES STEEL

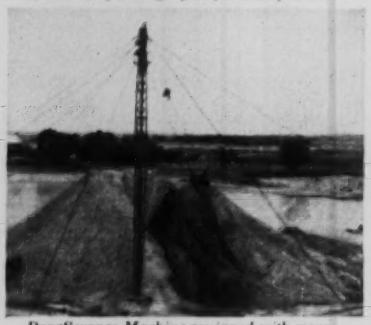
Watch the **United States Steel** Hour on TV every other Wednesday (10 p.m. Eastern time).

USS

HAUL IN MORE PAYLOADS WITH THE SAUERMAN METHOD



Sauerman Track Cable Method for digging and delivery to high pile from deep water.



DragScraper Machine equipped with movable anchor conveys material to top of pile from 50 ft. under water.

Operator tensions track cable to lift bucket off bank. Gravity returns it to digging point 400 ft. away.

DIG AND CONVEY
from steep hills... over rough terrain... on marshy ground... in deep water

Sauerman Track Cable Drag-Scraper Machines operate where wheeled equipment cannot go and crawlers can't travel without the nuisance of mats. They are especially suited for spans up to 1000 ft. or more and where material has to be placed on a high pile or embankment.

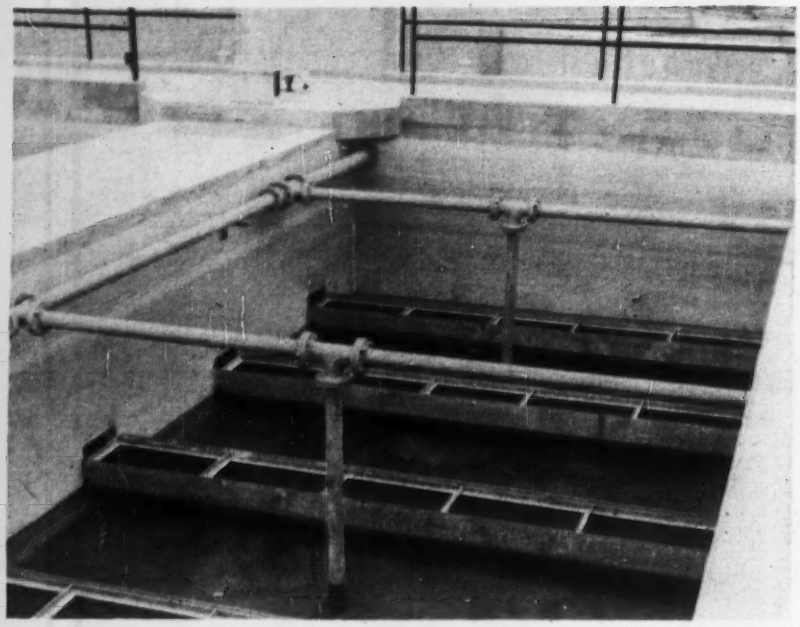
Crescent Buckets up to 15 cu. yds. haul at ground level, dump when lifted and are quickly returned by gravity to the excavation. This fast operating cycle boosts output and lowers costs.

•

Ask for details about the Sauerman Method in connection with your operation. Request Catalog A.

SAUERMAN BROS., Inc. 632 S. 28th STREET BELLWOOD, ILLINOIS

. . . First use of glass fiber troughs



WASH WATER TROUGHS are of prestressed glass fiber ¼ in. thick impregnated with polyester resin. The troughs momentarily deflect about 3/16 in. at start of backwash.

in. across, 18 in. deep and 13½ ft long with cylindrical bottoms. Glass fiber angles and circumferential bands are employed for bracing and reinforcing.

So far as is known, this is the first such use of glass fiber. Troughs were reasonably priced and are non-corrodable.

The troughs were molded of glass fiber impregnated with polyester resin, having a tensile strength of 73,000 psi and a flexural modulus of elasticity of 4 x 10^6 psi. When they are fully loaded, the wash water troughs momentarily deflect approximately ⅜ in. at start of the backwash.

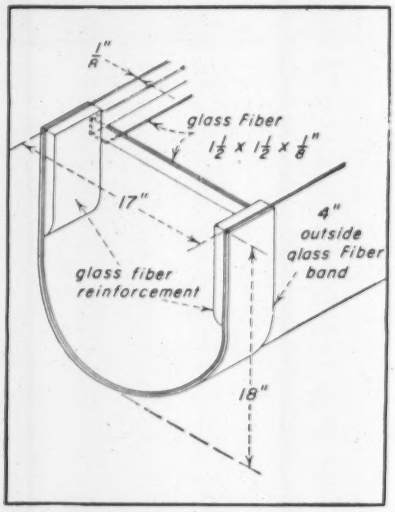
Backwash and bay separation valves are hydraulically operated butterfly type. Backwash water, supplied by pumping is discharged from the filters to a wash water basin, then pumped back into the raw water basins for reuse.

The small clearwell beneath the filters is of interest because of the use of ¼ in. prefabricated asphalt panels as the floor.

El Centro's modern plant employs ferric sulfate as coagulant and powdered limestone as aid, both of these are fed in solution.

Base feed rate is set manually at each feeder, after which feed is proportioned automatically by the influent meter at the clarifier.

A multi-pole rotary switch permits each of two solution feed chlorinators to be controlled either by plant influent or effluent propeller meter: In addition, a 2-in. three-out valve manifold allows chlorine to be fed at any of three alternate application points.



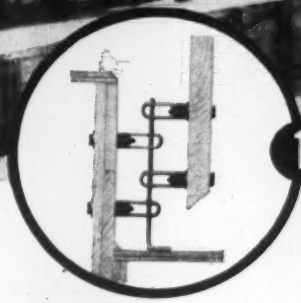
MOLDED SECTIONS deflect 3/16 in. on 13½ ft length when fully loaded.

The project was designed and supervised by Golden, Bryant & Jehle, El Centro, architects and engineers. Contractors were Fred J. Early, Jr., Co., of Los Angeles, plant; N. L. Basich Co. of Los Angeles, raw water basins; Glanville Plumbing Co. of Bakersfield, pipelines; and Chicago Bridge & Iron Co., filtered water storage ranks.

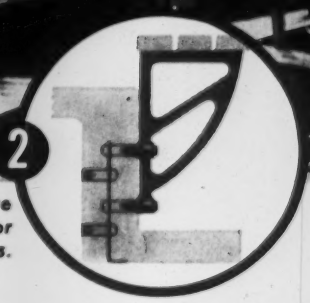
City Manager Leonard McClintock administered the project.

Building a Grandstand, Stadium, Balcony?

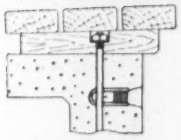
SUPERIOR RISERFRAMES Perform Two Functions

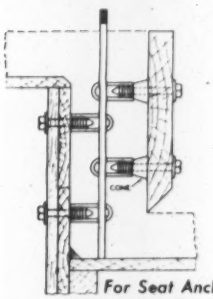


1 *Support, space and align front riser form.*



2 *Provide secure anchorage for seat brackets.*

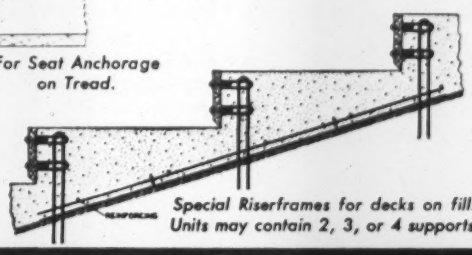




For Seat Anchorage on Tread.

The advantages of Superior Riserframes have been demonstrated and proved in the construction of hundreds of grandstands, stadiums, and balconies of auditoriums and theatres.

The front riser form is accurately supported, spaced and aligned by the Riserframe to which it is secured by temporary coil bolts. After stripping, seat brackets are easily attached with permanent ½" coil bolts which engage the coil sockets embedded in the concrete. For seat anchorage on treads, Riserframes with ½" diameter cold rolled rods, threaded at one end, are used for the vertical connection as shown in drawing at left. A nut secures the metal bracket or wooden seat bolster. For decks on fill there are special Riserframe units as shown below.



Special Riserframes for decks on fill. Units may contain 2, 3, or 4 supports.

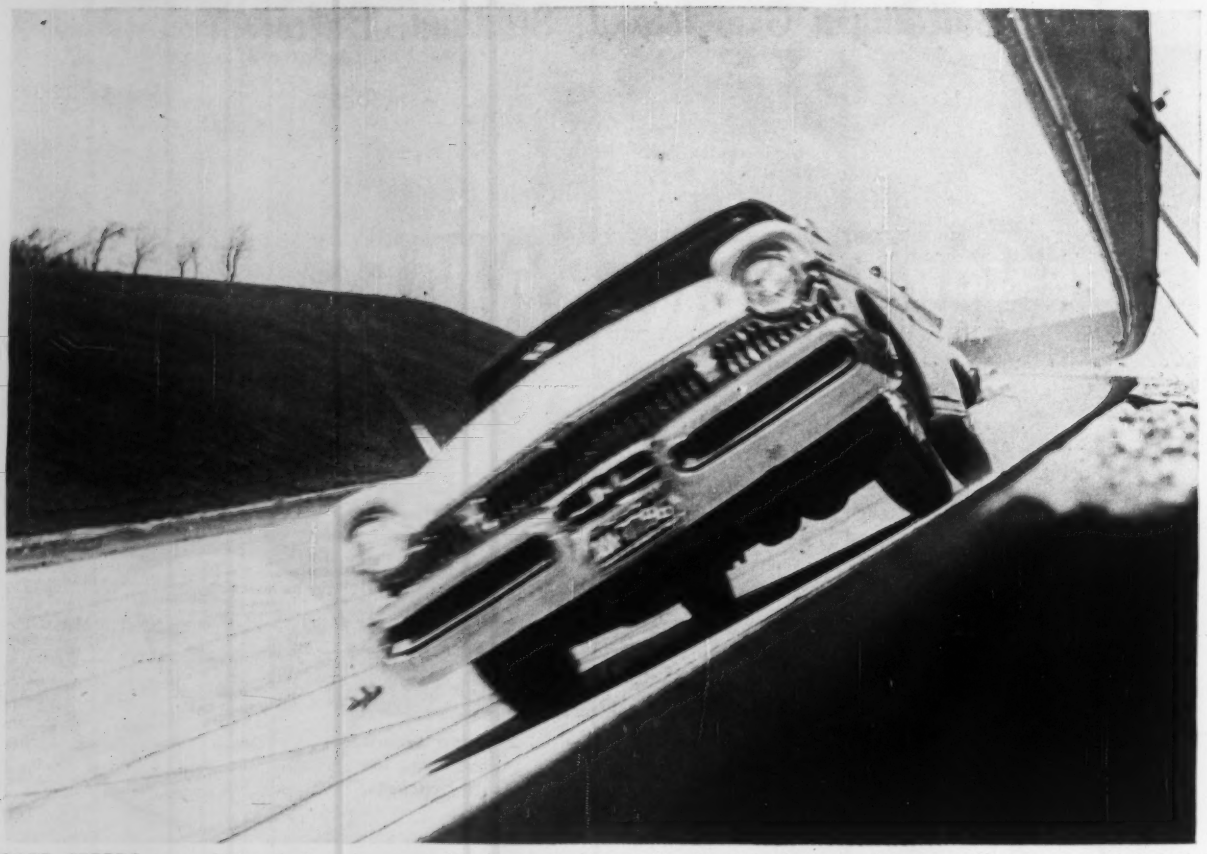
On your next job . . . use Superior Riserframes. There is a type of Riserframe for any possible job requirement. A preliminary layout and estimate will be prepared from your plans without charge or obligation. For additional details request a copy of our complete 60-page catalog.

SUPERIOR CONCRETE ACCESSORIES, INC.

9301 King St., Franklin Park, Illinois
(A Suburb of Chicago)

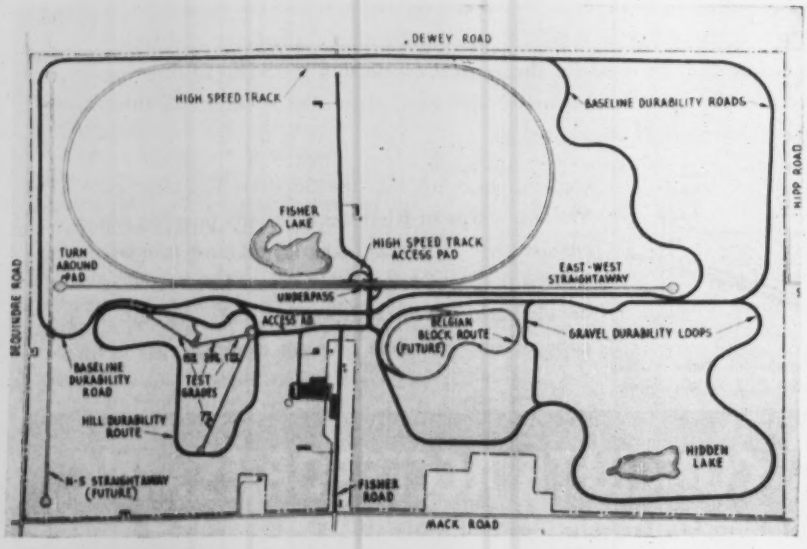
New York Office
1775 Broadway, New York 19, N. Y.

Pacific Coast Plant
2100 Williams St., San Leandro, Calif.



SAFE SPEEDS—up to 180 mph if you're a test driver—are possible on this sharply banked turn of high speed test track. At 140 mph, car will "track" around curve on its own, without driver help.

Test Track: Tough on Builders and Autos



THE TOUGHEST ROADS have been laid out on this 3,800 acre site near Detroit, for testing stock model automobiles

Completing one of the nation's largest private road construction programs, the Ford Motor Company this month dedicated its new automobile test track near Romeo, Michigan. Construction involved more than 4 million cu yd of earthmoving, 17.5 miles of paved roads, and 8 miles of gravel-surfaced road.

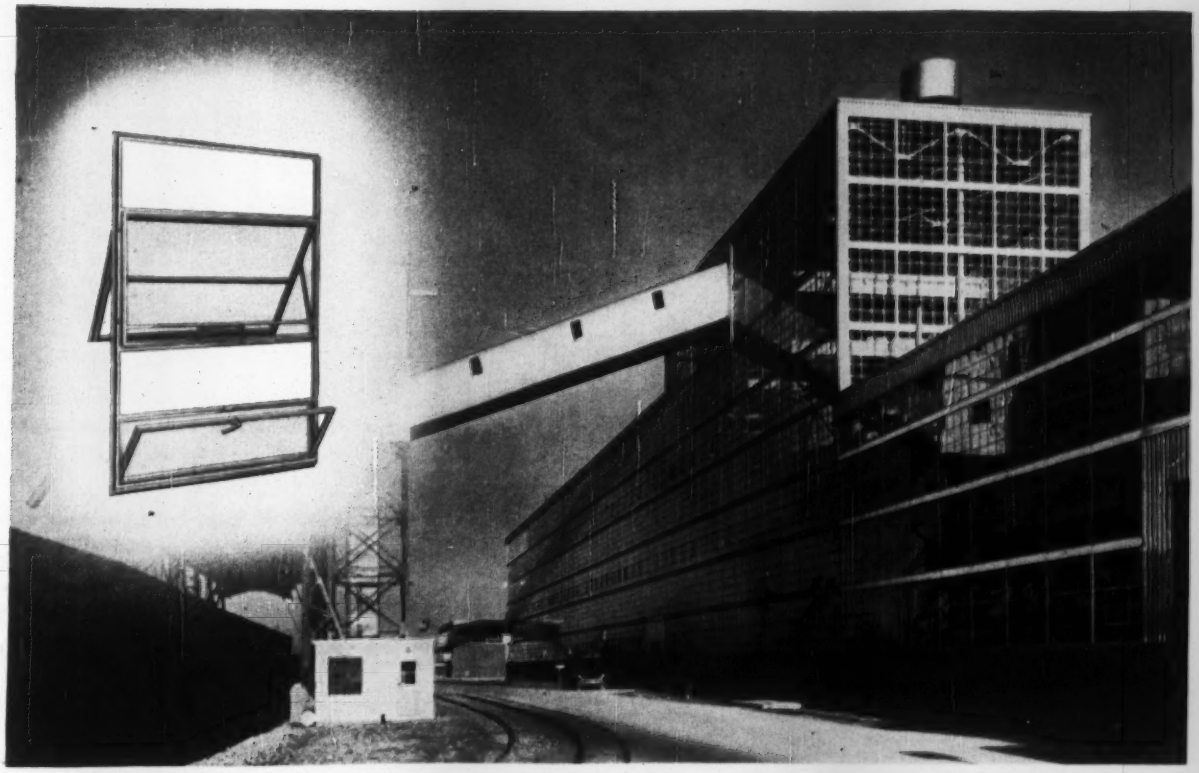
Site of the nek test track—officially the Michigan Proving Ground—is the 3,880-acre former Hi-Top Farm, which happens to contain the highest land elevation in southeastern Michigan—1,167 ft Mt. Trombly.

On this acreage, which was selected because of the variation in terrain and the opportunity it offered to simulate all types of driving conditions, Ford engineers laid out:

A five-mile oval speed track, 60 ft in width, designed for safe speeds up to 180 mph, concrete paved;

A 13,200 ft east-west straightaway with 200 ft dia concrete turning pads at either end, 36 ft wide;

(*Continued on page 58*)



MIB* benefits 10 ways with BAYLEY Aluminum Projected Windows

*MODERN INDUSTRIAL BUILDINGS demand windows — as well as other equipment — that will cut maintenance to rock bottom. Bayley Aluminum Projected Windows will do just that! And it's quick to see why!

- ★ **Eliminates painting — carefree service**
- ★ **Permanent and modern appearing**
- ★ **Rugged in design — no complicated mechanism**
- ★ **Complete — ready for installation and glazing**
- ★ **Universal — adaptable to all types of construction**
- ★ **Glazing from outside — flat surface inside — easy to wash and clean**
- ★ **Ventilators work smoothly — not affected by warping and sticking**
- ★ **Projected-out ventilators give awning-type weather protection**
- ★ **Projected-in ventilators provide no-draft ventilation**
- ★ **Rugged hardware — simple and apparent in operation**

As metal window specialists — with a 77 year background — Bayley has originated many of today's most important window improvements. The Bayley Engineers responsible for such advances are available to counsel with you on your window needs. They have the experience — and facilities — to completely engineer, manufacture and install windows that will give you the most economical lifetime window service. Call your local Bayley Representative or write *today*.

Also in New Curtain-Wall Systems

Bayley's Curtain-Wall System, incorporating Bayley Projected Windows, is winning exceptional favor for its economy in this new trend of wall construction. We'll gladly send, upon request, this Designers' Idea File.

THE WILLIAM BAYLEY CO.

SPRINGFIELD, OHIO

District Sales Offices: Springfield • Chicago • New York • Washington

Vari-Typer speeds up highway drafting jobs

No more costly hand lettering...

Vari-Typer does the job

4 TIMES FASTER !

Letters tracings even 12 feet or more wide
Hundreds of instantly changeable type faces

Why hold up highway engineering projects while high-priced draftsmen do simple lettering jobs? Your office typist..using a Vari-Typer.. can do lettering *4 times faster!*

The Vari-Typer Model E-24 composing machine is specifically designed to give clean, crisp lettering on drawings, specification sheets, bills of material, etc. It accommodates cloth or paper tracings even 12 feet or more wide. Type faces are instantly changeable (many available with engineering and mathematical symbols). The Vari-Typer is easy to operate.... your office typist can learn it quickly.

Save valuable draftsmen's time.... speed up all types of engineering jobs. Ask your nearby Vari-Typer man for a free demonstration, or write Dept. E-24 for a free bulletin.

Text of this advertisement by Vari-Typer, Headlines by Headliner.

Vari-Typer

VARI-TYPER CORPORATION
720 Frelinghuysen Avenue, Newark 12, New Jersey
Subsidiary of Addressograph-Multigraph Corporation

. . . Tough test road

UPHILL GRADES such as no highway engineer would dare design are part of the tough test pattern.

A total of 10 miles of asphalt-surfaced "durability" roads, incorporating rolling, irregular country, rough surfaces, grades up to 25%, sharp turns;

Eight miles of gravel roads, with sharp curves, and grades up to 9%.

In addition, water courses, ponds and swamps, and unimproved cross-country trails are included in the hazards to which stock cars will be subjected in the test area.

Probably toughest problem for S. J. Groves & Sons, Inc. of Minneapolis, general contractor, was construction of the speed track. The five-mile-long oval incorporates 180 deg turns at each end, and these have been designed for "neutral speeds" of 140 mph—a condition where a car entering the curve at 40 mph or less will "track" around without sideway or steering control by the driver. To accomplish this purpose, concave contours had to be scooped out at the curves, and superelevation runs as high as 60%—with the outer edge of the pavement at these points as much as 11.5 ft higher than the inner edges. Nearly 200,000 sq yd of 9 in. thick reinforced concrete were used to pave the track.

Another special problem was placing the asphalt surfaces on what the engineers designed as an "average" road—complete with bumps, rough spots, patches and ruts. Pavers, designed of course to eliminate such conditions, had to be modified to produce what the engineers wanted, and in some areas, hard work was necessary to custom-build the hazards.

Planned for the future is another road loop, paved with "Belgian Block" to add still more torture.

Construction was supervised by Ford Motor Company's Plant Engineering staff, with planning and layout by the Ford engineering staff. Gannett, Fleming, Corddry & Carpenter of Harrisburg were in charge of engineering of the road facilities.

TORQMATIC shifts at full throttle– eases haulers out of muck and mire

THE TERRAIN is rough. Some of the grades are 15% or more. You're hauling 50-60 tons.

So you need TORQMATIC DRIVE.

You need TORQMATIC because it quick shifts at full throttle. No lags or stalls between gears. You need TORQMATIC to eliminate the gearshift guesswork of clash box transmissions. TORQMATIC not only eliminates guesswork – it can increase engine life 47%!

You need TORQMATIC to get loaded haulers out of soft mud and mire quickly without towing.

You need safety, too, the kind of downhill safety TORQMATIC provides with its optional hydraulic retarder. You just pull a lever for slow descents *without riding the service brakes.*

Take a tip from 55 manufacturers of 122 different kinds of road-building and construction equipment. Get the Allison TORQMATIC story.

Ask your equipment dealer or write: Allison Division of General Motors, Box 894 E, Indianapolis 6, Ind.

NO. 2 IN A SERIES ON SPEEDING AMERICA'S ROAD-BUILDING PROGRAM

GM TORQMATIC

Allison

TORQMATIC DRIVES

ALL NEW 27-YD.
FULLPAK* SCRAPER

WITH NEW BIG B
TOURNAPULL®

advertisement

Pushed by 210 hp C Tournatractor®, the BIG "B" bites into half-frozen, hard-packed clay for a heaped payload. Direct-line thrust from pusher to cutting edge gets big loads fast, easy.

High, curved tailgate on low, wide Fullpak Scraper rolls dirt freely into all corners of the bowl to get maximum payloads. Above view taken from cockpit of Twin-C* pusher. Grill minimizes spillage over tailgate.

TOP money-maker for contractors with big yardages to move in a hurry...

- **New low-and-wide easy loading Fullpak Scraper**
- **Improved prime-mover with modern styling**
- **Choice of 293 hp Cummins or 300 hp GM engines**
- **Loads faster... boils better**
- **Gets low-void payloads**
- **More pay-yards with same pusher power**
- **Puts more profit in big-yardage production**

IF you now have big-yardage contracts under way . . . or plan to tackle large volume work in the near future . . . the new BIG B Tournapull, with new 27-yd. Fullpak Scraper, is the machine you need for bigger production and resulting bigger profits.

The low, wide Fullpak Scraper design has been fully proven for fast and easy loading. It has seen world-wide service for over a year on the modern 18-yd. Model C Tournapull. This companion 27-yd. Fullpak for the big Model B Tournapull, loads just as easy — heaps just as fast — as the smaller 18-yd. Fullpak.

You don't build a new scraper like this overnight! For two years the new BIG "B" has been exposed to rigorous tests in the toughest working conditions. LeTourneau-Westinghouse engineers — who pioneered the 2-wheel, rubber-tired prime-mover, and perfected the electric-control Tournapull-Scraper — brought all their vast experience to bear on the development of the new "B". They have made this new machine easier to handle, easier to service . . . introduced new economies and operational advantages that will earn bigger returns for you on your investment.

— turn page for more on "New B" 'Pull ▶

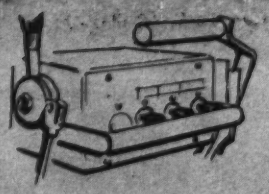
Spreading . . . notice how high-lift apron on B Fullpak clears a big 7'1" opening, and positive-ejection tailgate thrusts forward to wipe bowl clean of stickiest materials. No "stuck-in" yards to carry back.

Coming out of cut, the BIG "B" gains speed rapidly to 28.4 mph. Low, wide bowl permits bigger heap, gives low center of gravity, provides greater stability on any terrain.

*Trademark

— more on "top money-maker"

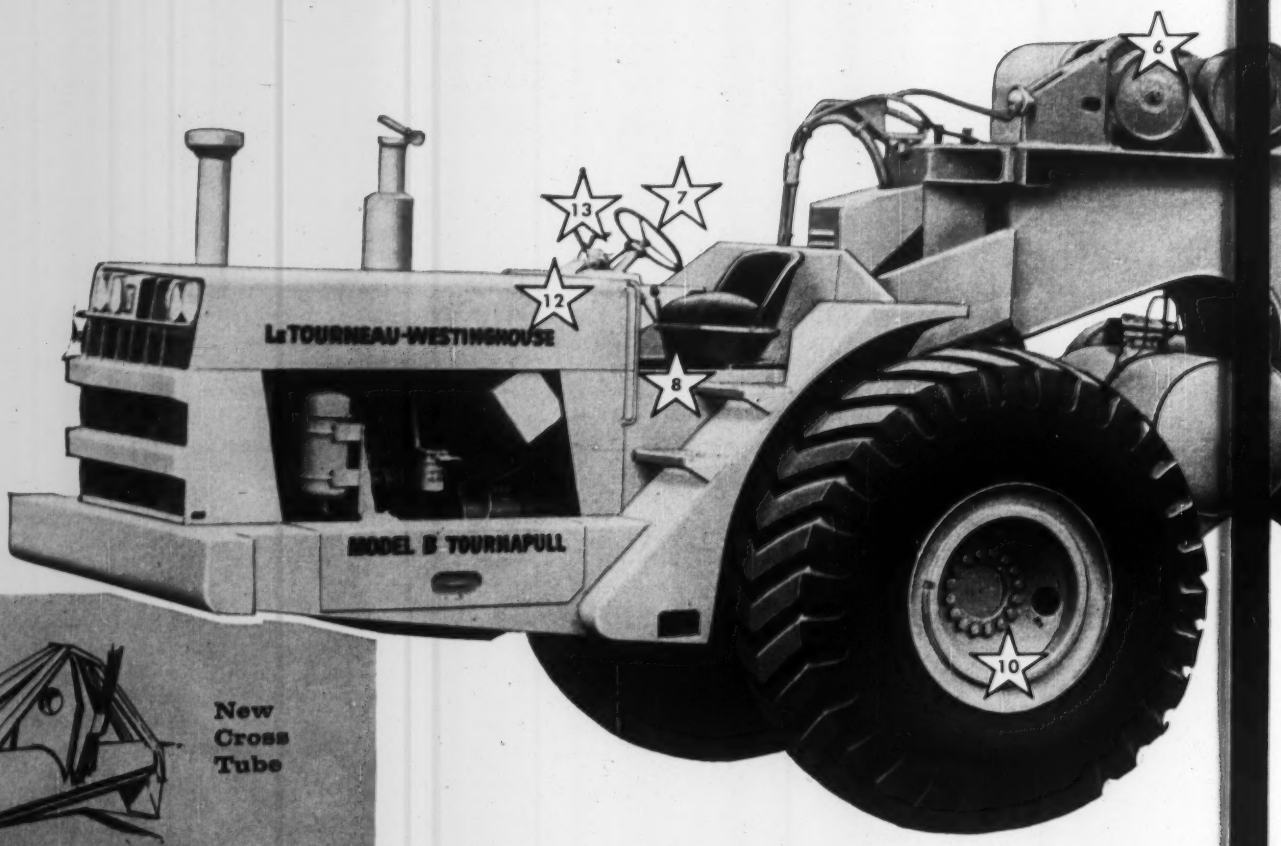
Look at the many advanced engineering improvements incorporated in the new BIG "B". To understand the profit-possibilities of this machine, you should see it in action. No other earthmover can equal it in lowest net-cost-per-yard performance. Make arrangements soon to see the BIG "B" demonstrating its profit-power.

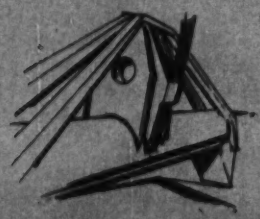


Exclusive Fingertip Electric Control

. . . instant, positive action, free of the trouble caused by worn clutches, long cables, sloppy linkage, or leaky hydraulic systems. Control is fast, weatherproof. Generator produces power only when power is needed.

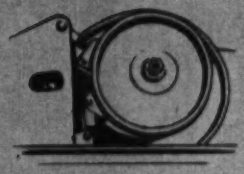
You get ALL these advantages





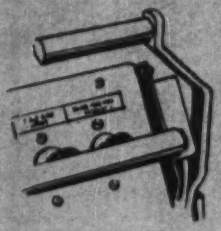
New Cross Tube

. . . keeps side-sheets in rigid alignment, yet does not restrict frontal opening of bowl.



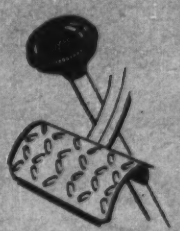
New Bowl Hoist

. . . single 3/8", 8-part cable is reeved for instant bowl control. Hoist cable drum is larger, increases rope life.



Quick Release

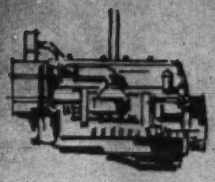
. . . operators can drop the bowl in an instant, or gradually. Cables still spool evenly. Hoist lines remain taut.



New Clutch Brake

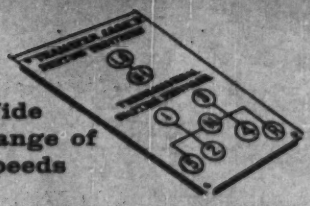
. . . for faster, easier shifting. Double clutching is no longer necessary. Clutch life is prolonged.

advertisement



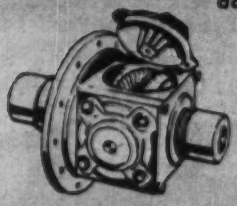
Big Power

. . . choice of 293 hp or 300 hp diesel, give fast acceleration and bulldog hang-on, reduce gear shifting.



Wide Range of Speeds

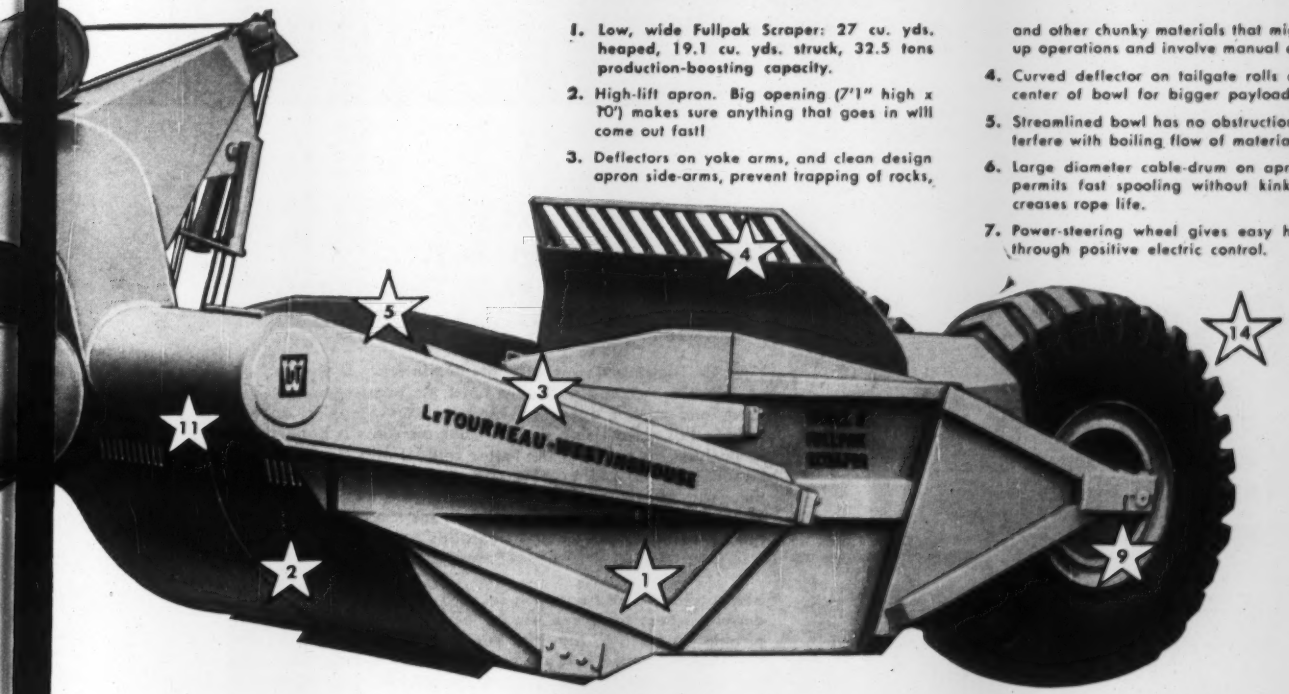
. . . ten gear ratios, with speeds from 2.6 to 28.4 mph, match working speeds to actual job conditions.



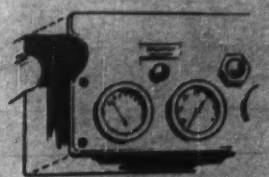
Exclusive Power-Transfer Differential

. . . automatically diverts power to wheel with best footing, when one wheel starts to slip. Normal differential action on turns is retained.

on new B Tournapull® with low, wide 27-yd. FULLPAK* Scraper



1. Low, wide Fullpak Scraper: 27 cu. yds. heaped, 19.1 cu. yds. struck, 32.5 tons production-boosting capacity.
2. High-lift apron. Big opening (7'1" high x 10') makes sure anything that goes in will come out fast!
3. Deflectors on yoke arms, and clean design apron side-arms, prevent trapping of rocks, and other chunky materials that might slow up operations and involve manual clearing.
4. Curved deflector on tailgate rolls dirt into center of bowl for bigger payload.
5. Streamlined bowl has no obstructions to interfere with boiling flow of material.
6. Large diameter cable-drum on apron-hoist permits fast spooling without kinking, increases rope life.
7. Power-steering wheel gives easy handling through positive electric control.
8. Cockpit is raised to give operator clear visibility. He can see both load and pusher at all times for closer coordination.
9. Scraper wheels are easily removed, and interchangeable with wheels on prime-mover. Outboard bearings give stable load support.
10. Multiple-disc air brakes, and sturdy brake elements, give quick stopping power, longer service, added safety factor.
11. Heavy cross-tube ties side-sheets rigidly together on low, wide Fullpak bowl.
12. Constant voltage transformer provides adequate power for control at low engine RPM.
13. Quick-release clutch and fast electric-hoist allow rapid bowl "pumping".
14. Large push-plate, of all-welded, reinforced box-type construction, provides big pusher target, keeps contact over uneven terrain.



Easier Maintenance

. . . entire switch panel lifts out easily for service. Rectifiers slide out. Grease fittings are centralized. Transmission and clutch are accessible in minutes. Engine can be serviced readily from sides or bottom. Less cable is used.

Condensed Specifications for New B Tournapull

Capacity: Tons 32.5
Heaped, cu. yds. 27
Struck, cu. yds. 19.1

Power: Choice of 293 hp Cummins
300 hp GM

Tires (Std.): Four 27 x 33 — 30-ply rating

Speeds: Ten forward 2.6 to 28.4 mph
Two reverse 2.4 to 3.5 mph

Turning Angle: 90° left or right

Width Required for 180° Turn: 39'10"

Control: Fingertip Electric

Brakes: Multiple-disc air brakes with 6552 sq. in. of braking surface

Dimensions:

Length	44'0"
Width	11'9"
Height	12'2"
Wheelbase	26'10"

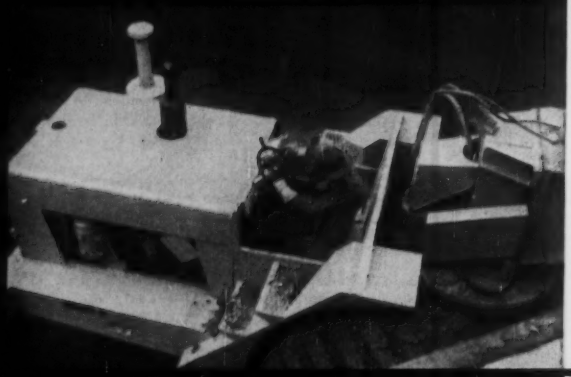
Shipping Weight (approx. lbs.) 68,900

(Specifications subject to change without notice)

*Trademark

— turn page for more on BIG B 'Pull ▶

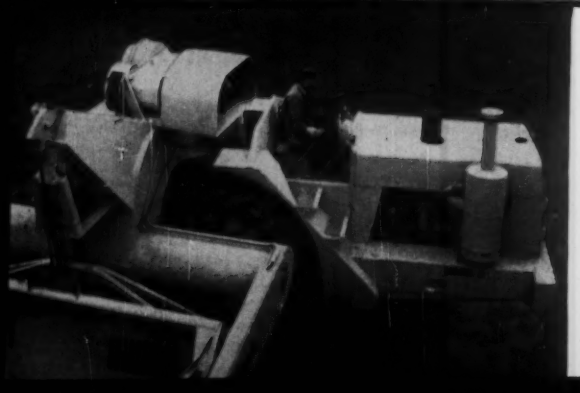
— more on "top money-maker"



Low yoke... high seat... gives operator of B Tournapull® clear view of load and pusher

Your B Tournapull operator sits comfortably in the cockpit of this big machine and only turns his head to see blade, load, and pusher operator. There is money-making advantage in this clear-vision design. Your operator is better able to position his machine for faster contact and closer coordination with the pusher. He can see the load, and control the depth of cut for faster loading . . . can easily see signal for a quick break-away the moment his load is heaped and ready for the haul. Clear-vision adds *speed!*

Seat on new B Tournapull is located at left of center, which enables operator to see blade, load, and pusher merely by turning his head to the left. His left hand is free to handle the steering wheel. His right hand rests comfortably over the electric-control switches. He is always in complete control of his machine, without twisting his body one direction while stretching in the opposite direction to reach hard-to-get-at controls. Your operator works relaxed . . . turns in more production at the end of every work-day.



180° turns in 39'10"

For a big earthmover — of 27-cu. yd. capacity — you can't beat the BIG "B" for effective work in close quarters. Empty or loaded, the scraper can remain stationary while the prime-mover swings right or left to make 90° turns. Operator turns steering wheel, and a powerful electric motor on kingpin housing pivots the prime-mover to the desired direction. With only 2 parts, rotor and stator, this brushless motor applies power simply and efficiently. Motor is unaffected by dust, dirt, moisture, or climatic conditions. The big machine lets you work in restricted areas . . . helps you speed production for bigger profits.

Profitable companion to the new B Tournapull is the big 420 hp LeTourneau-Westinghouse Twin-C* push-tractor. With its 2 big 210 hp motors synchronized for maximum push-power, its 80,400 pound weight, big 29.5 x 29 tires, and speed to 20 mph, you have the push necessary to get capacity 27-cu. yd. loads in less than a minute.

See for yourself why the BIG "B" is your top money-maker for moving big yardages...FAST

When you estimate your next big-yardage project, figure it first on the basis of using your present equipment. Then figure it again with 27-yd. B Tournapulls handling the production hauling. Compare these figures. You will see how the BIG "B's" — with their advantages of bigger capacity and faster movement — haul more yardage in less time. You will see how they can help you beat job-completion dates, make it possible for you to submit winning bids, help you make bigger profits.

Your LeTourneau-Westinghouse Distributor has all the facts and figures necessary for you to use in making comparative estimates. He can give you information, also, concerning price, trades, and deliveries. Since the new B Tournapull is bound to have a place in your equipment spread of the future, it will pay you to write or 'phone now for full information. Plan to order well ahead of required delivery . . . the best equipment for you is best for others, too.

*Trademark BP-1431-G

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

Computer Firm Sells Pipeline Net Analysis

A newly formed electronic computing firm is building a flourishing business out of analyzing water distribution networks for all comers.

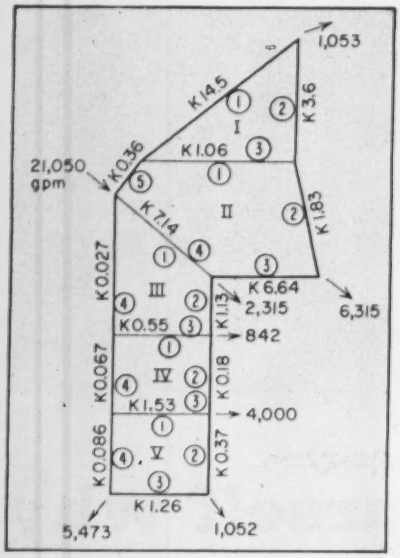
All the customer has to do is fill out a simple form for each loop giving his estimated flow in each line (Q) and the line's physical properties in the form of a K factor. A few hours later, or perhaps in a day or two if the company's digital computer is particularly busy, he receives the usual answers in gpm and head loss for each line of each loop.

The firm, Datics Corp. of Fort Worth, Tex., charges its customer a unit price per loop per iteration required to achieve a stated head loss accuracy using the Hardy Cross method of analysis. Present charge is 42 cents. For example, a 10 loop network requiring six repetitions to converge would cost $25.20. A good engineer would require about two days to do the same work.

The company's method of charging points up the importance of good initial estimating of pipeline flows. Good performance here is easily and quickly spotted in dollars and cents savings through fewer iterations.

• **Little change for engineer**—In utilizing the computer service, the engineer lays out his problem in the normal manner, as shown in the typical network sketched. Input and output Qs and length, diameter and friction coefficient of each pipeline would have to be known. The engineer then estimates magnitude and direction of Q in each line as usual, but then converts this to a percentage of the total flow into the network for insertion on the computer firm's form. He also has to calculate K factors for each line. Only other information required on the form is identification of the pipelines by loop and line number, and the total inflow. Answers are returned in the units supplied, usually gpm and ft of head loss.

The Datics Corp.'s Hardy Cross digital computer program will accommodate a maximum of 50 loops of 10 lines each. Once the digital computer is loaded, it proceeds automatically through all necessary iterations, much in the normal manner but thousands of times faster. The computer works out head losses in the network for the assumed flows, calculates ΔQ and tests for head loss differences within each loop. If they are within the prescribed limit, the machine stops and prints out answers; otherwise it applies Q corrections and repeats the process as many times as necessary.



Answers are automatically printed out on a tabular sheet something like—

Flow	Head Loss	Loop Identity
xxxxxxxx.xx	xxxxxxx.xxx	
0000483752	0000036039	0004010303
−0001406207	−0000012655	0003040000
−0000483752	−0000036039	0003030401

The minus signs indicate counterclockwise direction within a loop. Decimal point is indicated in the x line. In the loop identity column, first two digits are always zero, the next two digits indicate loop number, the following two the line number. The last four digits represent the line's position in the associated loop, and would be zero if it were not part of a second loop.

Actual machine time for the illustrated problem is one minute; including preparation and handling the entire Datics operation consumes about an hour.

The company is one of the first successful users of the electronic digital computer for analyzing pipeline network problems. Two consulting engineering firms, Rader &. Associates, Miami, and Brown & Caldwell, San Francisco, are among the earliest pioneers in this regard.

Solution: Three Pumps, A Mile of Plastic Pipe

Three pumps and a mile of plastic pipe were used to keep drought-threatened Holton out of the emergency category applied to 50 other communities in Kansas.

When the city's reservoir was left with about a six month supply of water, wells were picked to supplement natural rainfall and runoff, and thus ensure an adequate water supply in the years ahead.

Three wells running from 65 to 95 ft deep were dug and equipped with pumps. Plastic pipe was decided upon, for speed and cost, to get the pumped water to a catch basin already connected to the city's distribution system. The city used 1,000 ft of 2 in., 2,540 ft of 3 in. and 1,380 ft of 4 in. plastic pipe approved by the National Sanitation Foundation. The job went fast—approximately a month was taken for digging the wells and laying the pipe.

The result is 324,000 gpd of water from the wells, more than enough to meet the requirements of the city and its 2,875 population.

Idea for Melting Ice

Air bubbles pumped to surface thaws Arctic lake

At Port Radium in Canada's Northwest Territories, just 50 miles south of the Arctic Circle, air bubbles pumped to the surface of Great Bear Lake thaw the 5 ft thick ice and permit a dredge to operate through the winter months.

The "bubbler" system of melting ice may be the solution to one of the major problems holding up mining and industrial development in northern Canada.

The idea is in use elsewhere by lumbermen to eliminate ice on log storage ponds and lumber intakes to sawmills. Ferry operators in Quebec find the system an effective and cheaper method of keeping channels free of ice. And permanent installations on the upstream faces of dams are used to keep gates operable.

In the Great Bear Lake project, which was developed by Atlas Copco of Canada, Ltd., compressed air is pumped through an underwater, perforated plastic pipe to create air bubbles that circulate the slightly warmer bottom water to the surface to melt the ice.

Eldorado Mining & Refining, Ltd., installed the system last December at its sub-Arctic Port Radium uranium mine. Throughout this winter, it was possible to keep the area around a dredge free of ice even in sub-zero weather. The suction dredge used by the company can now operate all year to reclaim tailings stored under water in Great Bear Lake.

Drafting Department Heads!

Faced by growing demands of the production boom... the shortage of experienced personnel?

Look how Bruning can help you add

to your Drafting Room!

Look How Many Ways New, Modern Bruning Products Add Manpower to Your Drafting Room by Saving Man Hours of Work!

SAVE
DRAFTING
MAN HOURS

SAVE
REPRODUCTION
MAN HOURS

SAVE
FILING
MAN HOURS

Right now when you need it... add manpower to your drafting room by replacing old or inadequate equipment and materials with these modern, time-saving Bruning Products!

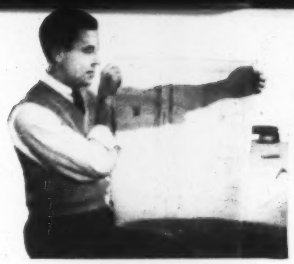
At the *drawing board*, at the *reproduction machine*, at the *files* . . . you can add manpower right now by helping your personnel turn out more work, faster and easier, with these modern, higher-production Bruning products.

See how modern Bruning drafters speed drafting up to 40% on most jobs . . . new and better tracing papers and cloths enable faster drawing and reproduction . . . improved intermediates slash re-drafting time for design changes . . . new, improved Copyflex machines provide faster and more convenient reproduction.

In the face of growing demands of the production boom and the shortage of experienced personnel, you couldn't choose a better time to replace old or inadequate equipment with these new, higher-production products you've been wanting. You couldn't pick a more opportune time to get management approval for new equipment expenditures.

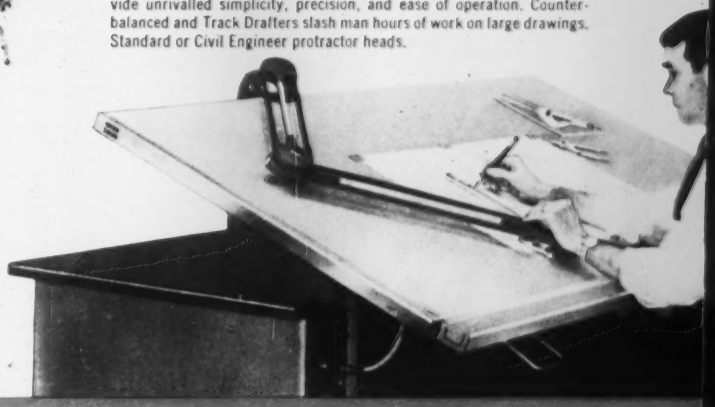
Bruning's wide selection of drafting aids includes not only standard items, but many special time-and-work savers such as dotting pens, proportional dividers, planimeters, special purpose templates, and Bruning electric erasing machines that save hours of finger-cramping manual erasing.

MODERN DRAFTING TOOLS AND SUPPLIES HELP SPEED DRAFTING



MODERN BRUNING DRAFTERS SPEED DRAFTING UP TO 40%

Over conventional equipment, Bruning drafters speed drafting up to 40% on most jobs . . . up to 50% on some structural drawings. Patented "Equipoise" gravity compensator, exclusive touch control indexing provide unrivalled simplicity, precision, and ease of operation. Counterbalanced and Track Drafters slash man hours of work on large drawings. Standard or Civil Engineer protractor heads.



MODERN BRUNING TRACING MEDIUMS SPEED DRAWING AND REPRODUCTION

These new, improved drawing mediums are unsurpassed for translucency, pencil-and-ink taking qualities, workability, permanence. You'll draw easier and faster; get cleaner, sharper prints, in record time.

Just Out! New "Visi-Vel" resin-transparentized tracing paper offers up to 25% faster reproduction speed!

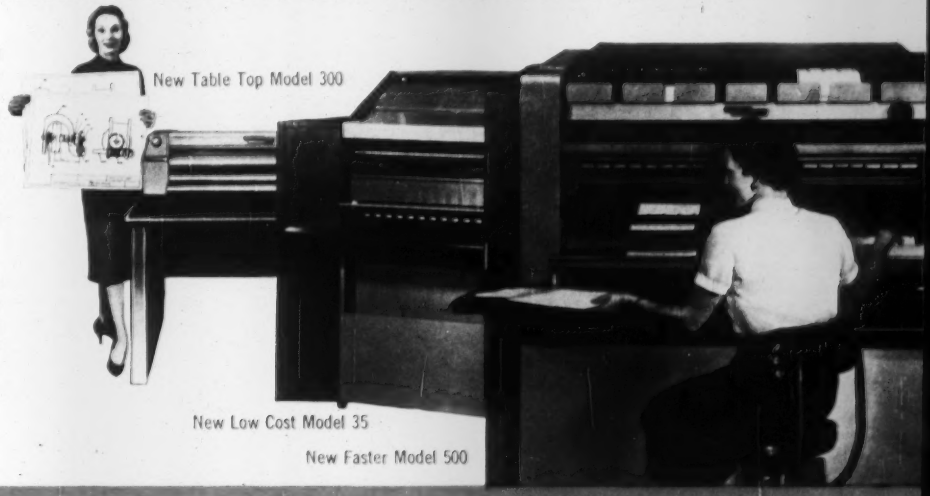
MODERN HAMILTON DRAFTING TABLES REDUCE WASTE MOTION AND FATIGUE

Unique design of Hamilton Auto-Shift lets draftsman work on any part of the board, reach reference table and drawers without leaving his seat. And you can put six Auto-Shift tables where you now have four boards with separate reference desks.

MODERN COPYFLEX MACHINES AND SENSITIZED PAPERS, CLOTHS AND FILM

Speed Reproduction! New, advanced Copyflex models bring you faster reproduction speed and a host of operator conveniences such as fast return of originals, automatic separation, front or rear delivery. And all the benefits of diazo black-on-white reproduction, plus problem-free operation and installation. No fumes, no exhaust ducts. There's a Copyflex model to meet every need and budget. New, better Copyflex sensitized materials work together with Copyflex machines to speed reproduction, give you premium results.

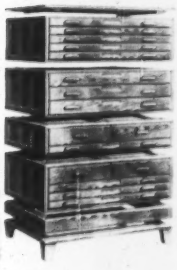
Slash Re-Drafting Time! Save up to 90% tracing time by making modern Copyflex intermediates (translucent prints) of drawings to be re-worked. Mask out unwanted portions before reproducing the intermediate, add new lines or sharpen up weak lines on the intermediate itself, produce sharp, clear prints from the intermediate.



New Table Top Model 300

New Low Cost Model 35

New Faster Model 500



HAMILTON WOOD FILING UNITS

Combine exactly the interchangeable units you need—in higher stacks—to save time and space. Sturdy oak construction.

PLAN HOLD FILING EQUIPMENT

Save time, space, and damage in filing large active plans. Spring-loaded, clamp-style binders eliminate punching, stapling, bolting or folding of plans. Binders are easily mounted in wall racks, floor stands, cabinets. A binder holds up to 150 plans.

MODERN HAMILTON ALL-STEEL UNITSYSTEM FILES SAVE TIME, SPACE; PERMIT ORDERLY EXPANSION

You file drawings and records in units especially designed for them by size and frequency of use. Drawings are easier to file and find, which saves time. UnitSystem's interlocking feature lets you combine exactly the units you need—in higher stacks—which saves space. It lets you expand your filing set-up gradually, efficiently, and economically.

GIVES YOU MORE TO HELP SAVE MAN HOURS . . . ADD MANPOWER TO YOUR DRAFTING ROOM . . .

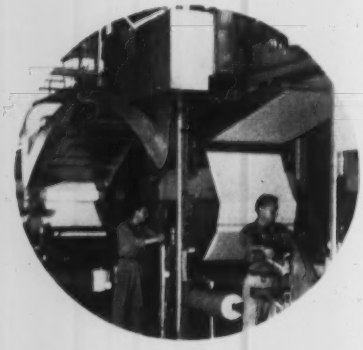
3 more reasons why you can depend on Bruning to help you

Save Man Hours... Add Manpower to Your Drafting Room!

Researcher, manufacturer, and supplier . . . Bruning saves you many man hours by providing a single, convenient, dependable source for everything you need in top-quality drafting room supplies and service. You simplify ordering and stocking, save time and money. You get the following important benefits!

New and Better Products— from Bruning Research and Engineering

Bruning Research and Engineering has introduced such great time-and-work savers as the first pencil tracing cloths, the first fume-free whiteprinters in America, the first band-type drafting machines. Today, by virtue of its modern laboratories and large engineering staffs, Bruning still leads the way. In just the last two years, Bruning has introduced five new, advanced reproduction machines, many newly improved tracing materials. You can count on more new and better products coming to help you save man hours, add manpower.



Consistently High Quality —from Bruning Manufacturing

In its own modern paper converting plants at Teterboro, N.J., Chicago, Kansas City, Los Angeles, and Toronto, Ontario, Bruning controls quality all the way to bring you tracing mediums and sensitized materials of dependable, consistent high quality. The famous Copyflex reproduction machines are entirely Bruning manufactured to provide you the finest in reproduction performance. You get better results, minimize the risk of trouble and loss of man hours.

▲ 36 Bruning Sales-Service Branches
● 6 Bruning Distributors
(▲) 5 Strategically Located Plants

The Product and Help You Need When You Need Them—from Bruning Sales Service

You suffer no costly delays—no loss of man hours—for lack of supply or service. With the most comprehensive network of sales-service branches, distributors, and plants in its field, Bruning assures you of prompt, dependable service and supply.

Your nearby Bruning branch is headquarters for a capable staff of Bruning sales-service specialists who are immediately available to you. Your nearby Bruning branch or distributor carries a full line of Bruning products and is staffed and equipped to give you fast, efficient supply.

Right now is the time to capitalize on Bruning's great time-and-work saving products and Bruning's outstanding service and supply. They work together to help you save man hours—add manpower to your drafting room, now when you need it!

BRUNING

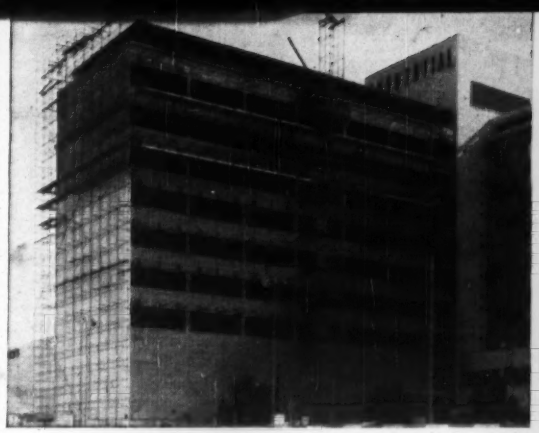
America's Leading Supplier of Engineering and Drafting Equipment

CHARLES BRUNING COMPANY, INC., 4700 MONTROSE AVE., CHICAGO 41, ILLINOIS

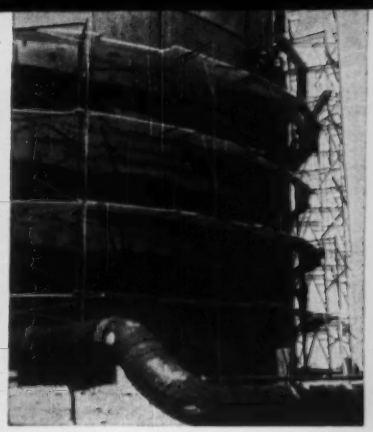
In Canada: Charles Bruning Co. (Canada), Ltd., 105 Church Street, Toronto 1, Ontario

A-2320

Printed in U.S.A.



TO BUILDING CONTRACTORS, steel scaffolding has long been a familiar time and money saver. Here, "TubeLox"® Scaffolding is used to provide platforms for masons and to support a monorail materials-handling system. Construction is a new addition to the Prudential Insurance Co. Bldg., Los Angeles, Wm. Simpson Co., gen. contr.



SPECIALIZED CONSTRUCTION techniques are required during erection of unusual and varied structures at Tidewater Oil Co.'s Flying A Refinery, Wilmington. To hold ease the job, C. F. Braun & Co., contractor, uses 15 miles of "TubeLox"® Scaffolding and 3500 "Trouble Saver" Sectional Scaffolding frames.

PIER COLUMNS for one of five overpasses on a section of New York Thruway get an assist from "Trouble Saver" Sectional Scaffolding. It supports vibrating machines and workers, and helps in the erection of formwork for above-ground sections of pier shells. Carlo Bianco is the contractor on this portion of the job.

Alert contractors show how to . . .

Cut Costs with Steel Scaffolding

ON ANY TYPE OF CONSTRUCTION—buildings, bridges, dams, roads, refineries and many others—contractors everywhere are realizing that modern steel scaffolding helps to move men and materials with greater speed and safety at lower cost. Because of its versatility of appliation, ease of handling, quick erection and dismantling, it can more definitely establish, often speed-up, completion dates.

Shown here are some of the typical jobs accomplished with the help of steel scaffolding. Mentioned also are only a few of the many types of scaffolding available. If you have a specific construction job coming up, you can get more detailed information simply by asking for it—no obligation, of course.

To help you with your scaffolding and concrete shoring methods, PS offers a complete nation-wide engineering service available to you locally. See the Yellow Pages in your 'phone directory for the nearest Patent Scaffolding office or representative that **sells** and **rents** "Gold Medal" Scaffolds.

FOR GREATER SAFETY...EFFICIENCY...ECONOMY

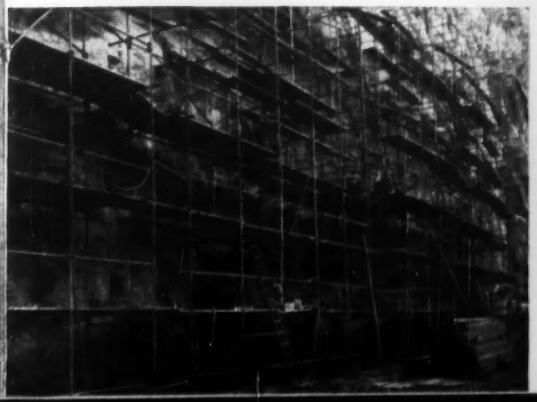
THE PATENT SCAFFOLDING CO., Inc.

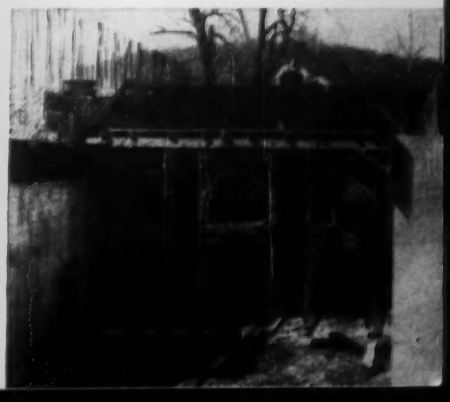
38-21 12th Street Dept. ENR, Long Island City 1, N. Y.
West Coast: 6931 Stanford Ave., Los Angeles 1, Calif.
***In Canada:* 355 Dufferin St., Toronto**
Branches in all principal cities

349 ROCK ANCHORS are installed by Selby Drilling Co., contractor, to secure huge slab above Nevada valve house at Hoover Dam. 11,000 lineal feet of "TubeLox" Steel Scaffolding, with posts on 7'6" centers, provides working platforms and is cantilevered inward to conform to rock face.

SECURITY WALL above rock face along Helix Roadway Approach to New York City's Lincoln Tunnel requires this "Trouble Saver" Sectional Scaffold. Grow Construction Co. uses prefabricated "Trouble Saver" Scaffolding frames and braces, and 22' long trusses, to form wide level platforms for workmen.

OVERPASS is shored by 272 "Trouble Saver" Steel Shoring 5'-wide frames on street location job at Scotch Plains, N. J. Mal-Bros. Constructions Co., contractor, erects 3' x 5' towers spaced 1' apart and in rows 2'6" apart to provide ample support for pouring new concrete roadbed, cutting costs 25%.





Interested in DEVELOPMENT ENGINEERING in the Sanitary Field?

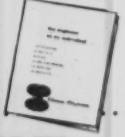
If you're a development-minded engineer — If you're interested in the development of new processes and equipment — If you want to practice your profession as a creative individual—If challenge, variety and freedom of action appeal to you . . . you'll be interested in the opportunities for development engineers in Dorr-Oliver.

Specifically, continued growth and expansion have created the need for engineers of varying levels of experience. Academically, a B.S. in Civil with sanitary option or chemical engineering is preferred. Experience should cover design of water and sewage treatment plants or operation and testing of field plants and preparation of reports covering development projects.

If this specification fits you . . . and most important if you like the concept of the engineer as a creative individual, we would like to hear from you. A letter, collect call or wire to E. E. Johnson, our Director of Personnel at Stamford, Connecticut, is all that is needed. We'll do our best to arrange an interview at your convenience.

What do we mean by "creative" engineering?

We'd like to send you a copy of "The Engineer as an Individual" . . . a new booklet which describes briefly our concept of the importance of the engineer to our worldwide operations.



DORR-OLIVER INCORPORATED

Barry Place, Stamford, Conn., Tel. Fireside 8-7311
Worldwide Research • engineering • equipment

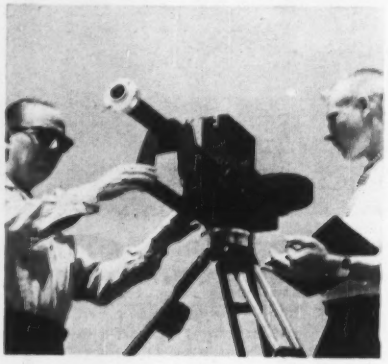
New Products

Horizon Camera Can Aid Plane Table Surveys

A new 360 deg horizon camera for recording vertical and horizontal images on 35 mm film has become available. Developed to make horizon profiles to predict radar or micro-wave patterns in an area, the camera can be used for plane table or similar work.

The camera weighs 20 lb and mounts on a surveyor's standard tripod. The instrument incorporates a precise level line and is designed to permit accurate measurement of azimuth angles, in spite of differential shrinkage of its record film or of photographic prints from the film.

The camera is available with a choice of lens and choice of scales for the azimuth angle. Current models use a 12 or 20 in. lens and have horizon scales of approximately 5 deg and 10 deg per in. A flare-reducing mask permits photographing almost directly into the sun with good results.



Set up and leveling for the horizon camera follows the same routines as setting up a surveyor's level. The camera turns through its 360 deg arc in one minute, the speed of turning being pre-set to control the exposure time. A constant speed drive motor is operated by a 24 v battery.

Film capacity is approximately 400 ft, sufficient to survey about 60 sites. The film chambers are darkroom loaded but may be installed or charged in day-

Excavator Is Convertible Five Ways

A new product of Thew Shovel Co, is fully convertible to shovel, crane, clamshell, drag and hoe. The self-propelled machine is mounted on a short coupled carrier with four wheel drive.

It requires no out-riggers to develop 7 ton lifting capacity in all positions of turntable swing.

The standard model provides three travel speeds in both directions up to 15 mph. The independent travel provides for traveling, hoisting, swinging, and boom derricking simultaneously with each under separate clutch control. Thew Shovel Co., Lorain, Ohio.

light, so different films may be used as required to penetrate ground haze. Infra-red and panchromatic are the principal types used.—AERO SERVICE CORP., 210 E. COURTLAND ST., PHILADELPHIA 20, PA.

Polythylene-Resin Pipe Resists Stress Cracking

SP plastic pipe is made from Allied Chemical & Dye Corp.'s new-type polyethylene resin which, states the manufacturer, because of higher molecular weight and a structure not present in any other known polyethylene, can be subjected to higher working pressures. It is claimed to have superior temperature resistance and to have overcome failure due to environmental stress cracking.

The pipe will be made to standard iron pipe sizes and carry the National Sanitation Foundation approval for potable water service. Being stronger, the manufacturer notes, it is somewhat less flexible than pipe made from other polyethylenes, but still will permit easying laying in the field. ORANGEBURG MFG. CO., INC., ORANGEBURG, N. Y.

Hydraulic Action Feature Of New Blast Hole Drill

A blast hole drill, self-propelled by two air motors, is mounted on crawler-tracks and has a knee-action frame that permits use in any terrain. It tows its own compressors.

All boom and feed-tower adjustments are hydraulically controlled. Finger-tip controls automatically position the feed-tower to eliminate manually moving the heavy parts.

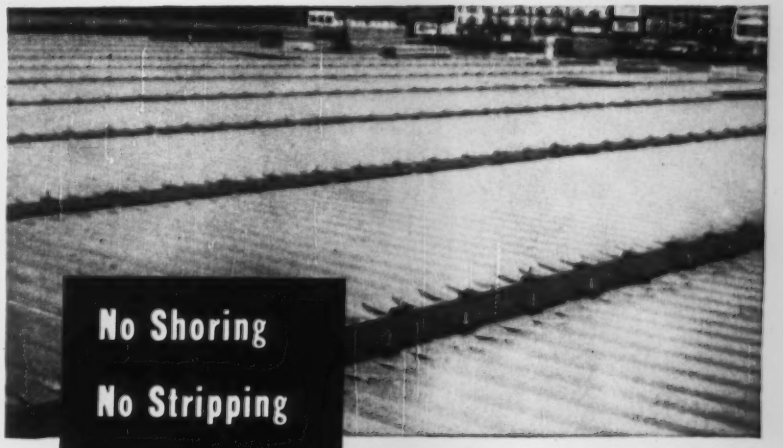
Two hydraulic cylinders operate the boom, allowing it to swing in a horizontal arc of 85 deg and a vertical arc of 82 deg. Three additional cylinders position the feed-tower for verticle, horizontal and angle drilling.

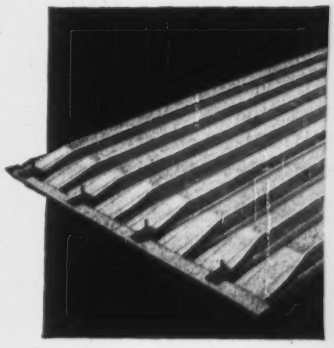
The entire operation of positioning and drilling can be achieved by one man. The crawler drill is known as the "Crawl-IR."—INGERSOLL-RAND CO., 11 BROADWAY, NEW YORK, N. Y.

Portable Air Sampler Safe in Explosive Medium

A simplified air sampling device has been developed by DuPont industrial hygienists for air pollution experts. It features a miniature jet engine, powered by low-pressure liquified gas.

The chief advantage of the new sampler is that it weighs less than two





U.S.F. Steel Forms are custom fabricated for exact fit to bridge structurals. More than required strength is provided to support the wet concrete. They install rapidly with common hand tools from *top side*, eliminating need for wood form construction, shoring, and safety nets. Permanently left-in-place, they eliminate costly stripping operations. Permits painting below-the-deck steel before pouring concrete. Speed up schedules—save time and labor—avoid penalties with the most practical method of deck form construction yet developed—U.S.F. Leave-In-Place Steel Forms.

Illustrated data sheet available on request

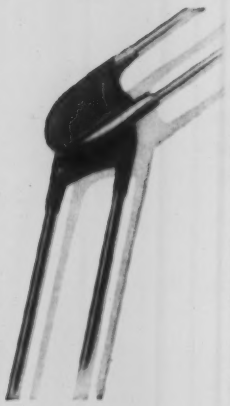
UNITED STEEL FABRICATORS, INC.
WOOSTER, OHIO
PRODUCTS
Hollow Metal Doors • Prefabricated Metal Buildings • Window Wells • Highway Guard Rail • Bridge Flooring • Steel Forms for Concrete Bridge Floors • Corrugated Metal Pipe • Sectional Plate Pipe and Pipe Arches

Paragon® gives you speed . . . without fatigue!

Check the response-to-the-touch. You can actually feel the difference!

That's why the Paragon Drafting Machine noticeably cuts end-of-the-day fatigue . . . saves costly man hours . . . helps raise working standards.

See how easily protractor control ring can be reached—no matter what position your hand is in. Another time saver. Touch that ring with your *little* finger and scales rotate freely. Release pressure and scales automatically lock to nearest 15° position. And intermediate angles are just as easily set!



Top day-to-day performance is guaranteed by unique "open center" design of arms which protects smooth-working factory-set band tension.

A good look at a Paragon and a touch on that control ring is worth 1,000 words! Try it before you buy *any* drafting machine—you can *feel* the difference.

89 YEARS OF LEADERSHIP

In equipment and materials for drafting, surveying, reproduction and optical tooling . . . in slide rules and measuring tapes.

K+E KEUFFEL & ESSER CO.

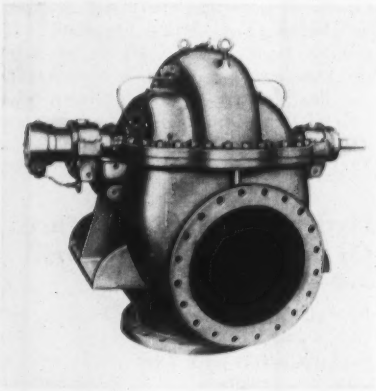
NEW YORK • HOBOKEN, N. J. • Detroit • Chicago • St. Louis • Dallas • San Francisco • Los Angeles • Seattle • Montreal

. . . New Products

pounds and is small enough to be held in one hand. The explosion-proof power source permits sampling under actual operating conditions in crowded quarters. Since the fuel control valve is the only moving part, no static electricity will be generated. It is said to be safe in any atmosphere.

Principal part of the device is an aspirator using a microventuri principle in which the propellent is ejected through a jet nozzle at high speed, creating a vacuum in the venturi cavity. The operating pressure of the aspirator and the air sampling rate can be automatically and continuously controlled.

Samples of air to be analyzed are bubbled through a test solution in a glass impinger attached. The device may be used for dust sampling, as well as determination of chemical air pollutants. E. I. DUPONT DE NEMOURS & CO., WILMINGTON, DEL.



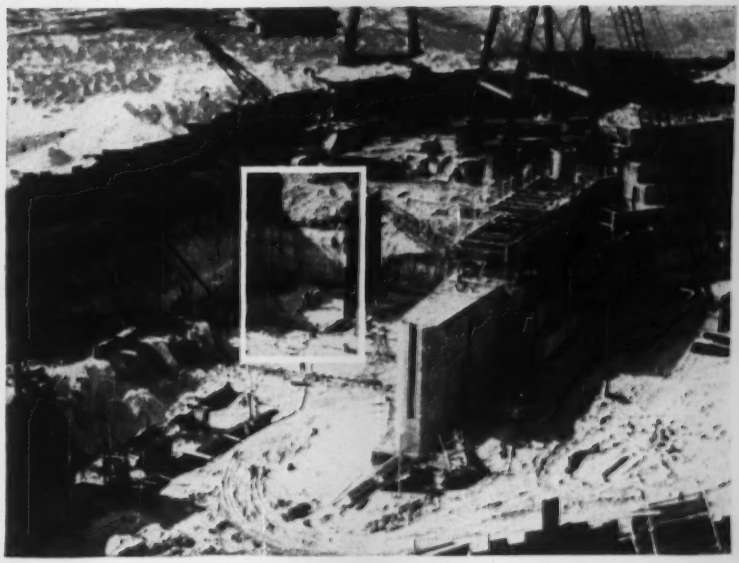
High Capacity Pumps For Severe Service

Two high capacity 24 in. centrifugal pumps, featuring split casings, have been introduced by Goulds. Rated up to 25,000 gpm, one has horizontal suction and discharge, while the second has vertical bottom suction and horizontal discharge.

Named Fig. 3420 and Fig. 3423, the pumps are single stage, double suction units whose horizontally split casings have upper and lower half bolted and dowelled together. Removal of the upper half casing permits inspection, maintenance and removal of entire rotating element without disturbing suction and discharge piping or pump and driver alignment.

Both pumps are fitted with renewable type casing wearing rings. Stuffing box is provided with square packing rings, removable water seal ring, and positively locked renewable stuffing box throat bushing. The stuffing box gland is of the split-cowl type suitable for use with

"DEWATER SANDSTONE WITH WELLPOINTS? *IT CAN'T BE DONE!"*



"STANG *DID IT!"*

Holding back the mighty Mississippi is a king-sized job anytime, but it posed a particularly tough problem on the St. Anthony Falls Lock and Dam project.

The job called for dewatering and support of a crumbly, porous sandstone material on the very edge of the river and immediately adjacent to the cellular cofferdam. The prime contractors Johnson-Kiewit, together with the U.S. Army Engineers supervising the project, made a daring decision. They called for Stang wellpoints to eliminate the serious piping which developed from the river, under the cellular cofferdam and on into the excavation area.

They banked on Stang's versatility and it paid off. The wellpoint installation was highly successful; not only eliminating the piping condition, but actually lowering the water table below the deepest subgrades.

Call on STANG engineers for experienced services and special equipment to solve your water handling problems—any size, any type, *anywhere!* STANG engineers are on call in your area for consultation day or night.

WRITE FOR BULLETIN 100. A

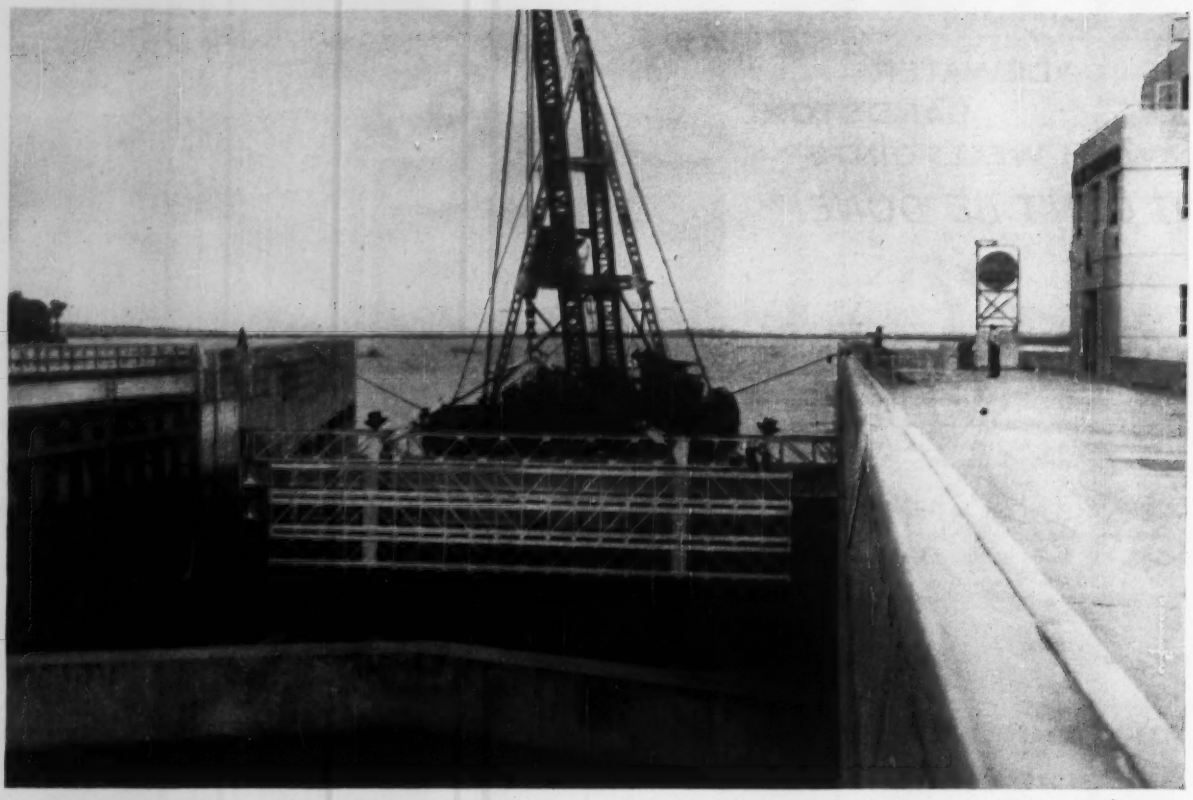
JOHN W. STANG CORPORATION

Engineers and Manufacturers of Dewatering Equipment, Wellpoint and Pumping Systems
Dewatering Planning—Equipment—Service

BELL, CALIFORNIA	OMAHA, NEBRASKA	TACOMA, WASHINGTON	TULSA, OKLAHOMA
8221 Atlantic Avenue	2123 South 56th Street	2339 Lincoln Avenue	4026 South Urbana Street
Telephone: LUdlow 2-7421	Telephone: Walnut 7796	Telephone: Fulton 3-3438	Telephone: Riverside 2-6929

572

Putting water in its place ...anyplace!



Derrick positions stop-log between walls of lock. Note use of lifting-beam (arrows) to facilitate hoisting of log. Photo by Corps of Engineers, U. S. Army.

Emergency lock gates for Florida navigation project

The Corps of Engineers, U. S. Army, designed these 87-ft lock stop-logs for standby service at the Jim Woodruff project at Chattahoochee, Florida. Weighing 22 tons each, they were fabricated entirely from Mayari R high-strength steel.

These stop-logs are stored on barges in the Jim Woodruff pool. In cases of emergency when it is necessary to unwater the lock to inspect or work on the lock gates, these stop-logs are lifted from the barge by a stiff-leg derrick and placed in position between the lock walls, one atop the other. The upstream face of each log has a steel skin-plate to hold back the water.

Two units loaded and ready for shipment from fabricating yard of Luria Engineering Co., Bethlehem, Pa. Top unit shows its downstream face, while lower one exposes the steel skin-plate on its upstream surface.

High strength was an important requirement here that made Mayari R a logical choice of material. By using this high strength steel the total weight of each stop-log was held to a minimum, making the logs easier to handle and place in position. Weldability was important, too, and Luria Engineering Company, who fabricated the logs by welding and riveting, encountered no difficulty in the welding, which involved more than three tons of welding rod.

Catalog 353 describes the corrosion-resistance, weldability, high strength and other properties of Mayari R in considerable detail. Scores of illustrated case histories add to the interest of the book, and may give you an idea or two. If you would like to have a copy, just get in touch with the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corp. *Export Distributor:* Bethlehem Steel Export Corp.

BETHLEHEM STEEL

Mayari R...High-Strength, Corrosion-Resisting Steel

quenching liquids. It is provided with packing rings to prevent liquid spraying and traveling along shaft outside the gland.

The pumps can be supplied with cast iron or structural steel bed plates for any form of driver—electric motor, diesel engine or V-belt—GOULD PUMPS, INC., 33 BLACK BROOK ROAD, SENECA FALLS, N. Y.

New Diaphragm Pump Is Lightweight, Compact

A diaphragm pump has been designed in which speed reduction from engine to pump is done in one step by a worm gear drive. This eliminates intermediate speed reducers and contributes to lighter weight and compactness.

The manufacturer claims that clogging is prevented even under adverse conditions.

The machine, with any standard engine or electric motor, can be obtained with suction accumulators and swing type valves or with ball check valves. RICE PUMP & MACHINE CO., BELGIUM, WIS.

Concrete Gun Available With Pneumatic Firing

A pneumatic gun, called the "Aircreter", for applying concrete and refractory materials, either dry or up to 5% moisture content, is now being offered.

The machine places 1 to 6 cu yd of material per hour. It is possible to adjust material flow or use free air alone; pressure is controlled by the air regulator.

Construction meets ASME code requirements on unfired pressure vessels. It is available in two sizes, for production work and patching. ENGINEERING EQUIPMENT, INC., WATERLOO, IOWA.

Truck Crane Allows One-Unit Loading, Hauling

A truck crane, just introduced, requires only 18 in. of space behind the cab and leaves the truck body free for hauling. Power for the crane is completely hydraulic.

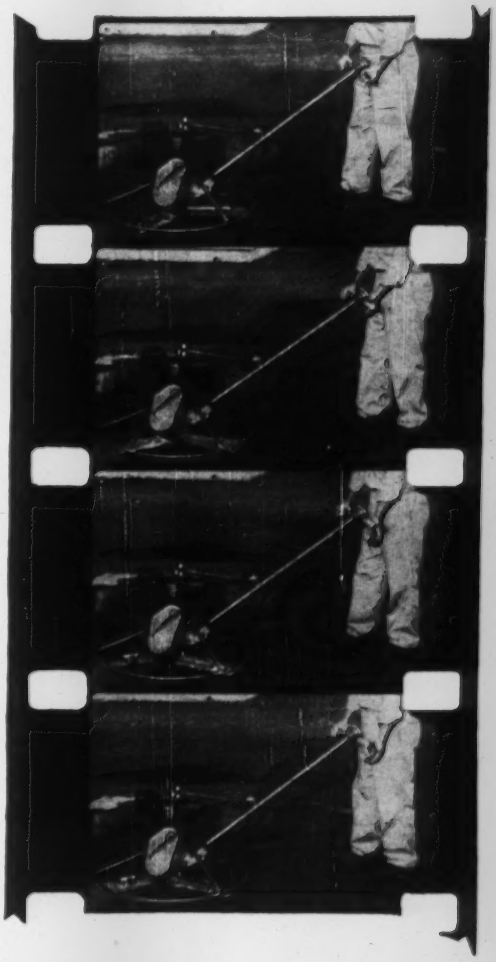
The boom swing is 280 deg. It projects and retracts in any position from horizontal to 85 deg elevation. Capacity is 5,000 lbs, and it has a relief valve to prevent overloading.

The high pivot point of the boom permits high loading against crane superstructure. The boom "topping" capacity is equal to the winch load line capacity. ANTHONY CO., 1750 BAKER ST., STREATOR, ILL.

A TROWEL BLADES IN MOTION

B CLUTCH CONTROL ON HANDLE IS RELEASED (NOTICE OPERATOR'S LEFT HAND)

C WITHIN ¼ TURN, OR 1/6 OF A SECOND, THE BLADES ARE COMPLETELY STOPPED



MOVIE FILM PROVES STOW ROTO-TROWEL STOPS *INSTANTLY!*

Close up of manually actuated clutch control which stops blade rotation within 1/6 second, when handle is released.

Just one of the big reasons why STOW ROTO-TROWELS are your best trowel buy! Within *one-sixth of a second*, Stow's Dead-Man Clutch Control stops the blades, but not the engine! That means Stow Roto-Trowels are SAFER, because the trowel blades stop the very *instant* the lever is released. What's more, this clutch makes the engine easier to start, since full throttle can be used if necessary. Stow Roto-Trowels also feature: fixed, non-rotating guard ring; pitch control on the handle; adjustable handle; lifting hook on the engine.

Available in 24, 29, 34 and 46" trowel diameters, in gas or electric models, Stow Roto-Trowels are built for safety and long life . . . built to produce excellent concrete finishes. For complete information on Stow Roto-Trowels, write for Catalog 560.

STOW MANUFACTURING CO.

19 Shear Street, Binghamton, N. Y.

On James Sales Elementary School, Tacoma, Washington

Fir plywood roof deck helps save $3,300^{00}$

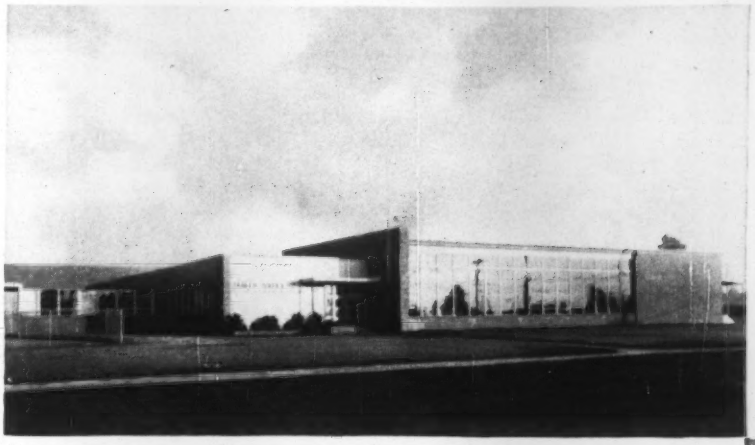
ALTERNATE COST DATA

Summary of installed costs per M sq. ft. Based on actual suppliers' quotations and time records where available and on Walker's Estimator's Handbook where not:

1. As built, with clips, eliminating blocking at panel edges. Includes cost of new plywood and 50% of initial cost of exterior plywood salvaged from forms $169*
2. Estimated cost as built but using all new sheathing with no salvage from concrete forms $187
3. Estimated cost all new sheathing with 2 x 4 blocking at panel edges . $206
4. Estimated cost 2 x 6 T & G decking . $291

*169.00 per M "as built" cost represents $122.00 per M savings over estimated cost of 2 x 6 T & G decking. On this basis, savings on entire job total **$3,300.00**.

To eliminate 2 x 4 blocking, metal "H" clips were used at unsupported panel edges. Two clips were used for each span. (Clips were responsible for approx. $20 per M of savings; see table above).



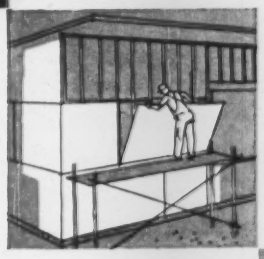
JAMES SALES ELEMENTARY SCHOOL;
Tacoma, Washington
ARCHITECTS: Lea, Pearson and Richards
CONTRACTOR: Nelson Construction Company
STRUCTURAL ENGINEERS: Smith and Murray

5 ways Fir Plywood builds better schools

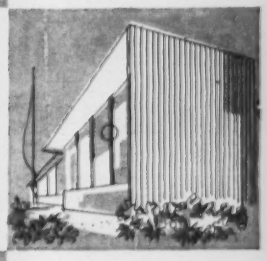
AN EXCELLENT EXAMPLE of how fir plywood roof decking sharply cuts costs as well as provides markedly superior construction is this new U-shaped, 1-story reinforced concrete school.

The contractor estimates ¾" fir plywood saved a total of $3,300.00 on the job; $2,800.00 in actual installed cost, plus an additional $500.00 by amortizing costs of some of the panels previously used for forms. A total of 27,000 sq. ft. were used on the job. Design calculations by the architects show plywood superior in resisting racking forces such as wind loads and earthquakes.

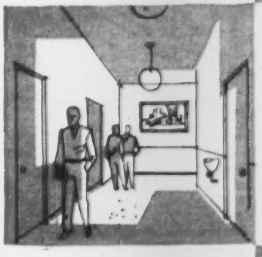
Although many home builders have found thick plywood over wide rafter spacing saves money, this is one of the first detailed cost analyses for a larger building. The idea points the way to new opportunities for reducing costs on commercial and industrial buildings as well as schools.



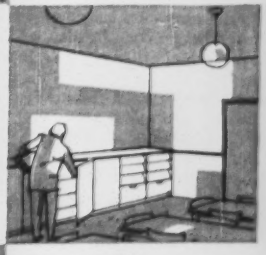
1. Strong, rigid, easy-to-apply wall and roof sheathing.



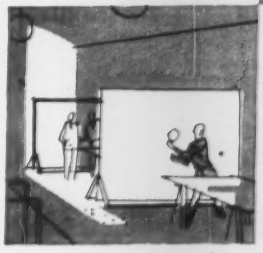
2. Smart, durable siding, soffits and exterior trim.



3. Attractive, damage-resistant paneling and wainscoting.



4. Good-looking wardrobes and storage lockers.



5. Inexpensive, easy-to-build screens, movable partitions.

DFPA TESTED QUALITY

Fir Plywood

means quality construction

FOR YOUR FILES: A new portfolio assembly of basic plywood design and application data for schools, homes, commercial buildings. Includes detailed information about job described above.

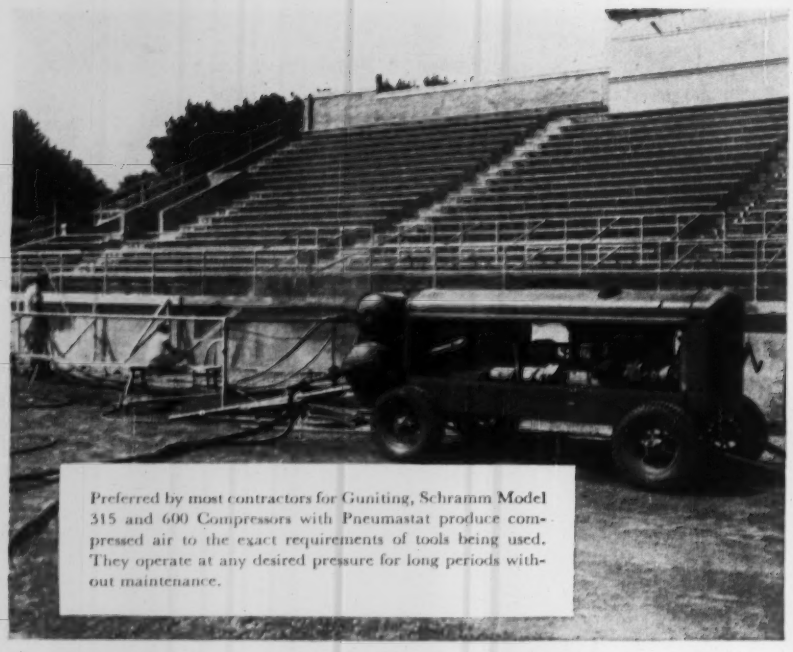
DOUGLAS FIR PLYWOOD ASSOCIATION, Tacoma 2, Wash.
(Good U.S.A. Only) Dept. 135
Please send fir plywood construction portfolio.

Name _____

Firm _____

Address _____

City _____ Zone ____ State _____



Preferred by most contractors for Guniting, Schramm Model 315 and 600 Compressors with Pneumastat produce compressed air to the exact requirements of tools being used. They operate at any desired pressure for long periods without maintenance.

CONTRACTORS SAY, "BEST FOR GUNITING—

Controls air delivery to exact requirements"

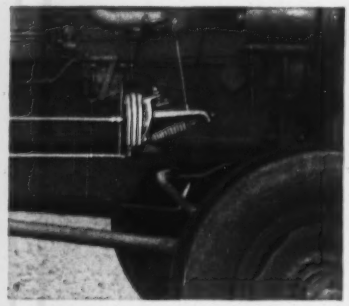
Fluctuating air pressure just *can't* wreck Guniting jobs when Schramm Compressors supply the air. *Reason:* Pneumastat! Installed on every Schramm Compressor, this patented Schramm control automatically gives you constant, uniform pressure—no variations. It also regulates air delivery to suit job requirements.

Pneumastat is the industry's simplest, most perfect instrument for controlling compressor speed according to the demand for air. Many other devices vary the speed in only two or three steps. Pneumastat does the job in an infinite number of steps. This is one of the reasons why most contractors prefer Schramm Compressors for Guniting.

Other reasons are long life and low cost. Schramm mechanically operated poppet-type intake valves last as long as the compressor. Multiple cylinder construction means less work for each discharge valve. Schramm engines operate at the speed for which they are designed, instead of being overspeeded to 1800 or 2100 rpm. *Result:* economical operation over long periods without maintenance.

Full details of Schramm Model 315 and 600 Compressors—most often used in Guniting—are yours for the asking. Write for Catalog 5501. Or see your local Schramm dealer for a demonstration; he's listed in the Yellow Pages of your Telephone Directory.

Schramm Portable Compressors—both gas engine and diesel driven—are complete air compression plants. The Model 600 shown here delivers up to 600 cfm at pressures up to 100 psi.



Smooth, uninterrupted air flow—the Schramm Pneumastat, exclusive, patented air-delivery regulator, automatically controls the speed of engine and compressor in accordance with air requirements. Saves up to 50% in fuel costs.

Schramm, Inc.
MANUFACTURERS OF AIR COMPRESSORS
620 North Garfield Ave. • West Chester, Pa.

Publications

Hollow metal doors—A revised 12-page booklet contains up-to-date specifications for panel and flush-type, hollow-metal doors, as well as details on hardware and accessories. STEELCRAFT MANUFACTURING CO., INC., 9017 BLUE ASH ROAD, ROSSMOYNE, OHIO.

Computer applications—Separate 8 and 12 page bulletins outline input and output data for an electronic digital computer for the following applications: highway earthwork quantities, analysis of a truss, traverse closure and long distance pipeline design. The booklets explain logic of the programs and illustrate data for typical problems.—ELECTRODATA DIV. OF BURROUGHS CORP., 460 SIERRA MADRE VILLA, PASADENA, CALIF.

Grading hardwood flooring—A booklet, containing the latest revisions in grading practice at northern hardwood flooring mills, explains to the purchaser what he is buying and the exact difference between established grades. It includes data on standard measurements, general rules for bundling, thickness and face widths manufactured, and tables to ascertain quantity of flooring required, grading Rules for Northern Hard Maple, Beech and Birch Flooring. MAPLE FLOORING MANUFACTURERS ASSOCIATION, 35 E. WACKER DRIVE, CHICAGO 1, ILL.

Aluminum extrusions—A 130 page handbook contains complete sections on the use of aluminum extrusions for architectural, structural, truck and trailer uses and industrial product applications. In addition, information on aluminum extrusions alloys, their mechanical and physical properties, tolerances, weights and manufacturing limits are given, as well as data on fabricating and finishing aluminum. BRIDGEPORT BRASS CO., 30 GRAND ST., BRIDGEPORT 2, CONN.

Guard rails—Design features, engineering data, erection instructions and specifications for Barrier-Beam and Universal-Beam guard rails are presented in an illustrated bulletin. Safety is offered at low cost, according to the manufacturers, who recommend both rails for use on highways, parking lots, race tracks, service stations and bridges. It also contains information on Structural-Plate Bridge Flooring for new and existing highway bridges, and data concerning the use of Leave-in-Place Steel Forms for concrete bridge decks. UNITED STEEL FABRICATORS, INC., WOOSTER, OHIO.

you know you're right when you specify by DFPA* grade-trademarks

factory-inspected, laboratory-tested

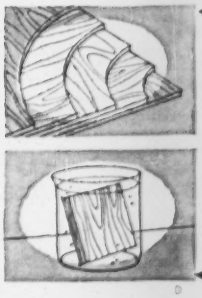
To qualify for DFPA grade-trademarks, manufacturers must pass rigid and *continuous* inspection of current plywood production. In addition to these on-the-spot mill checks by DFPA quality supervisors, thousands of samples undergo scientific testing in DFPA laboratories. *Use of grade-trademarks may be withdrawn if quality is not satisfactory.*

right grade, right quality for every job

DFPA grade-trademarks are specification guides to the *right* grade for a specific job. Only genuine DFPA quality-tested panels bear DFPA registered grade-trademarks. *There are imitations. Don't be misled!*

Be sure you can tell the difference.

Send for the *DFPA Quality Story*—a portfolio of grade-use data and a step-by-step description of the DFPA quality control program. Write Douglas Fir Plywood Association, Tacoma 2, Washington. (Offer good USA only)



◀ Proper construction—inside and out

▲ Adequate strength, rigidity and stiffness

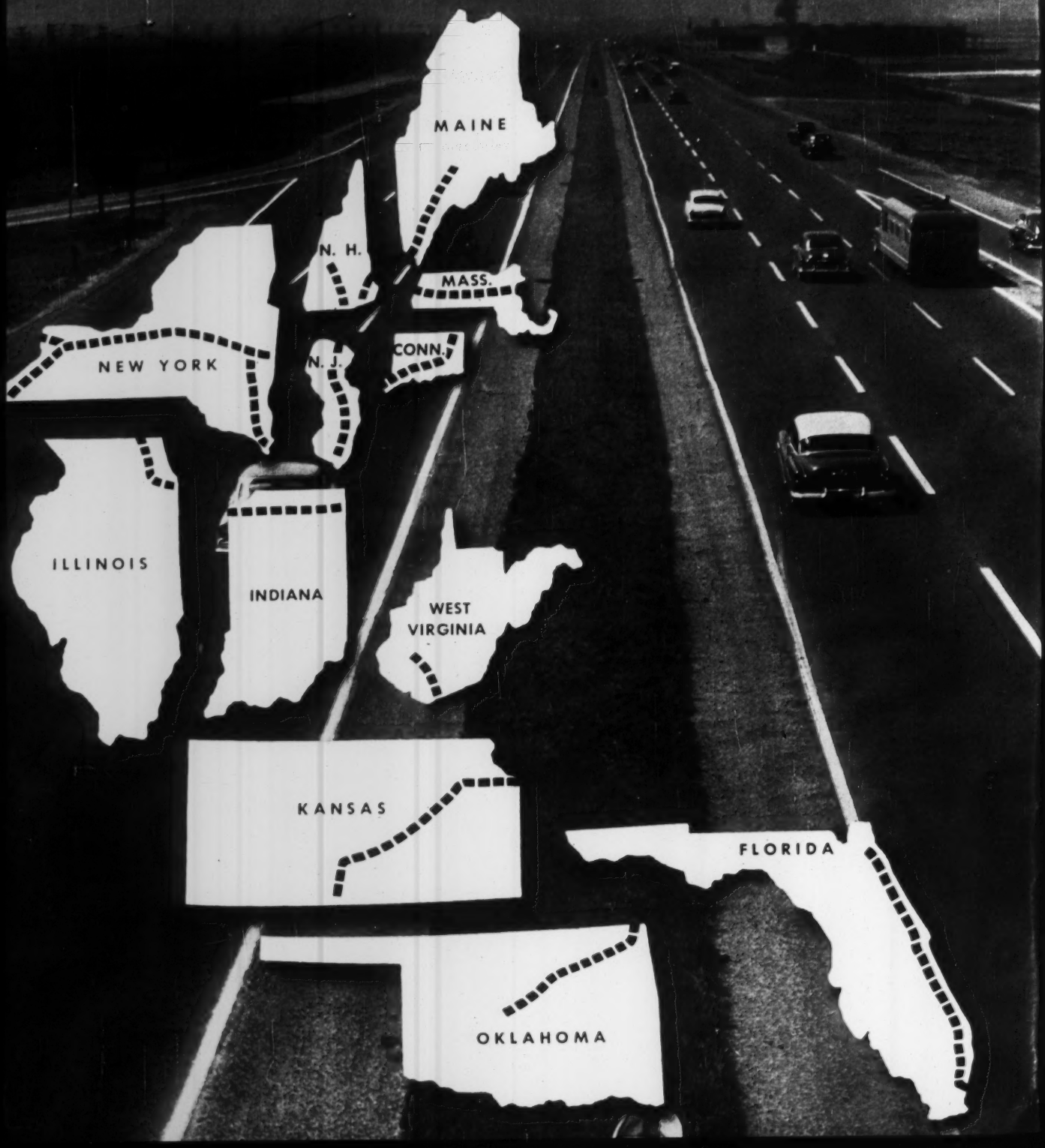
◀ Dependable glue-line

*DFPA stands for Douglas Fir Plywood Association, Tacoma 2, Washington—a non-profit industry organization devoted to product research, promotion and quality maintenance.

DFPA TESTED QUALITY

DFPA grade-trademarks mean quality **Fir Plywood**

How Liberty helped contractors



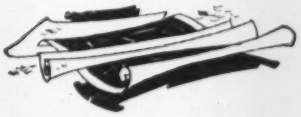
cut costs on 12 superhighways

Contractors have found that Liberty Mutual's loss prevention ideas save big money. That's why Liberty Mutual is one of the leading writers of compensation and liability insurance for highway jobs.

For instance, Liberty insured part of all 12 of the major superhighways pictured here. In each case, Liberty Mutual Loss-Prevention Engineers carefully analyzed potential hazards long before work started. As work progressed, they were constantly on the job — making test blasts; planning detours and barricades (one-quarter of all public liability cases against contractors involve public vehicles striking barricades or equipment); advising on equipment movements; and assuring good housekeeping.

Most of the accidents reported on road jobs are the result of negligence. You can see the importance of having an alert, expert team of loss prevention engineers working with you on every job. Liberty knows how to help you prevent accidents — and that means lower insurance costs, less equipment damage, fewer idle workmen, and less down-time. It pays to insure with Liberty Mutual.

10 WAYS LIBERTY MUTUAL CUTS INSURANCE COSTS ON CONSTRUCTION JOBS



1. ADVANCE ANALYSIS, by Liberty engineers, spots and controls potential hazards before each of your projects begins.

2. ENGINEERS ON THE JOB who keep your men safe, control damages due to blasting, unsafe operating methods, etc.

3. RESEARCH by specialists in Liberty's own laboratory helps solve your difficult problems.

4. AROUND-THE-CLOCK CLAIMS SERVICE — full-time claimsmen on the bigger jobs — assures fast, fair claims handling.

5. ABILITY TO FOLLOW YOUR OPERATIONS — Liberty has branch offices in 146 cities — at your service.

6. SERVICE PERSONNEL live on large projects both here and abroad, plan and guide safety operation.

7. LARGE MEDICAL STAFF, plus two rehabilitation centers, assures the best treatment for injured men.

8. SPEEDY AUDITING service, tailored to your needs, assures proper allocation of payroll classification.

9. YOU DEAL DIRECT with company sales, loss prevention, claims and medical personnel. No middlemen.

10. INSURANCE AT LOW COST. Liberty's "expense ratio" on Compensation is lower than any general writing insurance company operating on a nationwide basis. Liberty has returned $363,275,898 in dividend savings to policyholders.

For 20 straight years — the nation's largest writer of Workmen's Compensation Insurance

LIBERTY MUTUAL

The Company that stands by you

Liberty Mutual Insurance Company • Liberty Mutual Fire Insurance Company • Home Office: Boston

WELDED or RIVETED
STEEL PLATE
FABRICATION

- Boiler Casings
- Boiler Breechings
- Flues and Ducts
- Condenser Shells
- Condenser Piping
- Heavy Turbine Housings
- Fan and Blower Housings
- Dust Collector Housings
- Industrial Gas Mains
- Expansion Joints
- Hoppers and Bunkers
- Tanks and Vats
- Pressure Vessels
- Wind Tunnels
- Crane Bridge Girders
- Trolley Frames and Trucks
- Rigid Frames
- Roll-Over Fixtures
- Tank Turrets
- Gun Mounts
- Heavy Truck Bodies
- Engine Frames and Bases
- Crawler Frames
- Press Platens and Beds
- Press Columns
- Heavy Machinery Parts and Assemblies
- Gas Seal Hoods for Blast Furnaces
- Furnace Roof Rings
- Design Conversion of Castings to Weldments

MACHINING

- Complete Machining Service—Facilities for Heavy Work of Unusual Dimensions

STRUCTURAL STEEL

- For Buildings, Bridges and Special Purpose Structures

Drum Gates
Roller Gates
Taintor Gates
Taintor Valves
Protection Angles

THE R. C. MAHON COMPANY
DETROIT 34, MICHIGAN
Branch Offices in New York and Chicago
MAHON

AWWA President

Fred Merryfield named head of water association

Fred Merryfield, newly installed president of the American Water Works Association (see page 26), is a man guided in his professional activity by deep-rooted personal conviction.

In 1928, five years after graduation from Oregon State College in Corvallis, he decided he wanted to teach sanitary engineering. He had spent the intervening time in railroad and heavy construction. But he felt that to do his best as a teacher at his alma mater, he must continue to practice engineering. For only in this way could he support his professorial endeavors and keep abreast of the changing engineering scene.

This eventually led to the formation of the consulting engineering firm of Cornell, Howland, Hayes & Merryfield of Boise, Idaho. He continues today in his dual teaching-consulting role.

Professor Merryfield also feels strongly on the concept of the well-rounded civil engineer. A widely read man, he believes engineers should educate themselves in the broadest manner with emphasis on the humanities. Let the specialization come later.

He would remind engineers to behave always as human beings first. This is prerequisite, particularly to effective presentation of their cases to political bodies—an area of practice that could stand much improvement, the professor believes.

Another of Professor Merryfield's great concerns is water rights law. It is a fortunate coincidence that he assumes the presidency of AWWA at a time when this question is so paramount.

Regarding organization for water resource development, he admits he is still exploring the various avenues of approach.

However, he is known to be favorably impressed with a method similar to the Royal Commissions employed in England and Canada: a group of leaders at the highest level of government with various technical agencies functioning beneath it.

Professor Merryfield has been active also through the years in the Federation of Sewage & Industrial Wastes Association and the American Society of Civil Engineers.

At present, he is regional vice chairman of the Education Committee of the Engineers Council for Professional Development.

Rags-to-Riches Award Presented to John Ware

John Ware, chairman of the board of Northeastern Water Co. and American Water Works Co., Philadelphia, has been honored with one of this year's Horatio Alger Awards of the American Schools & Colleges Association.

Presented annually to prominent business and professional leaders who have achieved success from humble beginnings, the so-called rags-to-riches award has found its way to a representative of the water field for the first time.

Mr. Ware's companies constitute the largest privately-owned waterworks system in the U. S., directly serving 4 mil-

Trane saves $27,000 a year burning coal the modern way

Consult an engineering firm

Designing and building hundreds of heating and power installations a year, qualified engineering firms can bring you the latest knowledge of fuel costs and equipment. If you are planning the construction of new heating or power facilities—or the remodeling of an existing installation—one of these concerns will work closely with your own engineering department to effect substantial savings not only in efficiency but in fuel economy over the years.

facts you should know about coal

In most industrial areas, bituminous coal is the lowest-cost fuel available • Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar • Automatic coal and ash handling systems can cut your labor cost to a minimum. Coal is the safest fuel to store and use • No smoke or dust problems when coal is burned with modern equipment • Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

As part of its current $12 million expansion program at all locations, The Trane Company, La Crosse, Wis., a major air-conditioning and heating equipment manufacturer, has recently modernized its power plant. Steam generating facilities were changed over entirely to a coal-fired operation and a 70,000 lb./hr. boiler was added. Coal and ash handling is automatic.

Trane has found that burning coal the modern way pays off in several ways. Overall cost of steam generation is cheaper. Fuel supply is readily available and dependable. And fuel cost savings amount to 25% over the next most economical fuel, totaling about $27,000 a year for the La Crosse plant alone.

For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

BITUMINOUS COAL INSTITUTE
Southern Building • Washington 5, D. C.

the portable
BUCK
HOISTING
machine

. . . gets you there
FASTEST
with the MOSTEST

Fastest — in 23 minutes you're up in the air with your first load. 23 minutes from trailing to elevating.

Mostest — Buck takes 2,000 lbs. per load with platform . . . 17 cu. ft. with concrete bucket.

Highest — Takes your materials quickly to heights 100 ft. and up.

Lowest cost per ton lifted. No additional personnel required . . . one man does it all . . . easily.

There's nothing like the Buck . . . it's a portable, self-erecting, self-contained hoisting machine.

For a free demonstration and more information contact any of the 73 Buck Dealers or write direct:

BUCK EQUIPMENT CORP.
720-E Anderson Ferry Rd., Cincinnati 38, Ohio

lion persons in 20 states and, in addition, operating 16 municipally owned water plants serving approximately 2 million people.

After a successful career in the electric utility field, at 39 John Ware took over the old and somewhat rundown National Waterworks Co. in 1927. After putting it on its feet, he began to acquire additional water properties, eventually ending in control of the system he now serves as chairman.

Retired Industrialist Takes On Utilities Job

On May 1 Thomas N. Bland took over the $22,200-a-year job of San Francisco public utilities manager, in charge of such activities as the international airport, municipal railway and water department.

The utilities' job was left vacant when James H. Turner, manager for 11 years, became head of the city water department.

Mr. Bland, 63, retired last year as president of Fibreboard Paper Products Corp., San Francisco, after 21 years with the company.

Brig. Gen. F. M. Albrecht For South Atlantic Post

Brig. Gen. Frank M. Albrecht has been appointed Division Engineer, South Atlantic Division, Corps of Engineers, effective in July. He will succeed Brig. Gen. Henry J. Hoeffer, who will retire from active service with the Army at that time.

General Albrecht is currently director of plans and programs, office of deputy chief of staff for logistics, Department of the Army.

Radzikowski Named Head Of Development at BPR

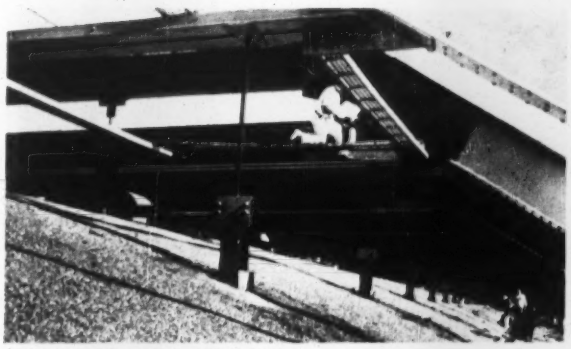
A Division of Development in the Bureau of Public Roads has been established with H. A. Radzikowski named as its head. The new division will initiate and execute BPR development work in the areas of electronics and electronic computers, aerial photogrammetry, road equipment and simplification of highway plans and operations.

Mr. Radzikowski, with the Bureau for many years, has been prominent in pushing application of many of the new techniques in these fields.

The new division will be part of the Operations Office under Assistant Commissioner A. C. Clark. Recently, the former divisions of Engineering, Finance & Management and Research were made "Offices", with Operations split off from Engineering.

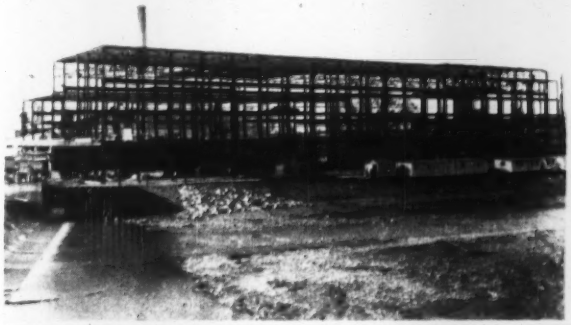
Construction costs go down

where steel goes up... BOLTED



SAVES DOLLARS PER TON! Faster than riveting, high strength bolting shortened erection schedule for externally supported roof of a Republic Aviation Corp. building. Bolting used two-man crews, less equipment, and saved an estimated $7 per ton of erected steel.

TIME CUT 33%! All connections in the steelwork of the 227,000 sq. ft. Pier "A" at the Hoboken Port Authority piers were completed in 2 months – a month less than for a similar job riveted. Production in the field averaged twice that of riveting with same number of men.



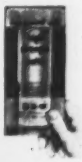
STRONGER CONNECTIONS — FASTER! High strength bolting for P. H. Glatfelter Company paper mill has fortified joints against much vibration and dynamic stress from machinery. Crews can be quickly trained on out-of-way location, and structures go up fast.

ECONOMY IN ASSEMBLY! For Hangar No. 9 at New York International Airport, members were assembled virtually from the ground up, since truss section height came to 22 ft. Field assembly proved economical because bolting is fast, conserves manpower.

RB&W High Strength Bolts save time, money, strengthen structures

THOSE are four typical cases you see above. In all cases, the erectors relied on RB&W High Strength Bolts for connecting the steel, and reported improvements in construction along with worthwhile savings.

Clean threaded, uniform RB&W high strength bolts assemble easily. Once tightened to recommended minimum tension, they *stay* tight. Stronger in shear and in tension under all types of loads, they can be used in place of rivets anywhere . . . buildings, bridges, equipment. The AISC approves. So do local codes.



Bulletin HS-1 gives information on high strength bolting useful on the job. Send for as many free copies as you need.

Write to Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N.Y. . . . *largest independent producer of high quality, high strength bolts for construction.*

R B & W

111th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee, New Orleans, Denver. **Distributors** from coast to coast.

Tru-Stop Brakes

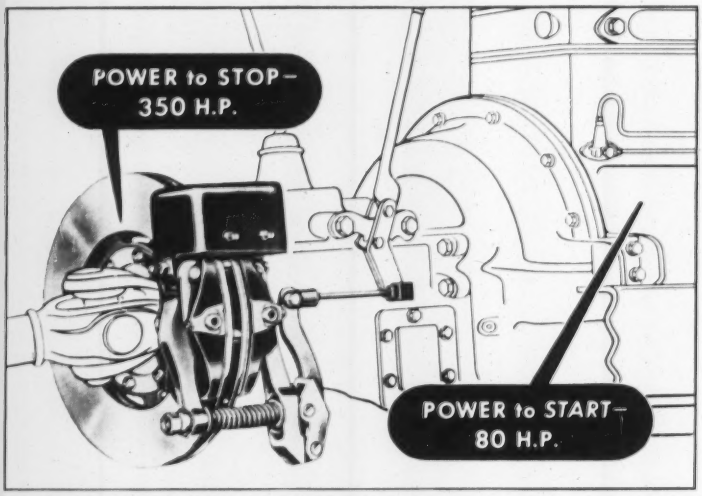
Meet Every Heavy-Duty Safety Requirement

OFFER POSITIVE PROTECTION AGAINST RUNAWAY OR PARKING ACCIDENTS—AT LOWEST COST

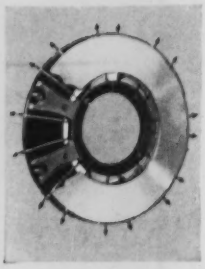
HERE IS WHY:

They have surplus power required for emergency service—no dangerous self-energizing

TRU-STOP Heavy-Duty Emergency Brakes are not only excellent parking brakes. They serve as a complete, independent and fully reliable braking system. Operating on the propeller shaft they enable the driver to continue on safely in the event of service brake failure. TRU-STOP brakes have the surplus braking capacity to be used *repeatedly* as an auxiliary to service brakes.

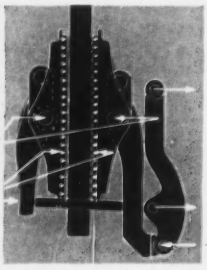


Brakes actually do more work than the engine in terms of horsepower Where it takes 80 HP to accelerate to 20 miles per hour, it takes 350 HP to make a safe stop from 20 miles per hour within required limits



Ventilated to throw off heat

Brake efficiency depends on ability to throw off intense heat —rapidly. Discs of TRU-STOP brakes are exposed to the air even during the braking operation. Ventilated design circulates air *between* the disc plates.

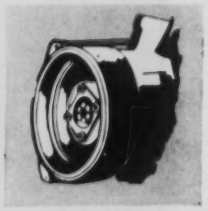


Give uniform brake pressure

Disc of TRU-STOP brakes is "squeezed" between the flat surface of the shoes. Effort applied to brake lever operates front and rear lever arms simultaneously. Pressure is exerted on the center of each shoe. Entire lining surface is in contact.

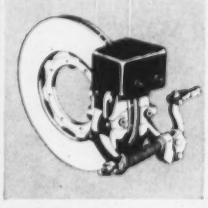
TRU-STOP HEAVY DUTY BRAKES OUTPERFORM AND OUTLAST DRUM-TYPE BRAKES

DON'T LET THE SURFACE AREA FOOL YOU!



Drum-type brake

43¼ square inches of lining. Lining covers 310 degrees of the drum. *BUT* only 50 degrees of the lining-covered drum is exposed to the air.

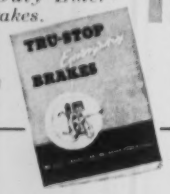


Tru-Stop brake

28 square inches of lining. 90 degrees of the disc under pressure. *BUT* 270 degrees of the disc is exposed to air. Directing and throwing off heat is basis of brake efficiency.

We will be glad to answer any questions or give you more detailed information about TRU-STOP Heavy Duty Emergency Brakes. Send for

Catalog DH 33



THE TEST

Drum-type Brake	vs	*Tru-Stop Brake*
After a few light and two heavy applications from 20 MPH, lining was useless for further test.		Repeatedly stopped vehicle from 50 MPH —was then used to decelerate on steep grades. No serious damage to lining.

Automotive and Aircraft Division
AMERICAN CHAIN & CABLE

601 Stephenson Building, Detroit 2
2216 S. Garfield Street, Los Angeles 22 • Bridgeport 2, Conn.

ACCO
TRADE MARK

Obituaries

Moses P. Halperin, 63, Ohio architect, died April 22 in Cleveland. Mr. Halperin specialized in designs of synagogues and temples. The Bureau of Jewish Education building, the Warrensville-Center Synagogue and the Temple Emanuel were among his principal works in Cleveland. Originally associated with the firm of Thayer & Johnson, he started his own company in 1936. Since 1948, he had been a partner in the firm of Braverman & Halperin.

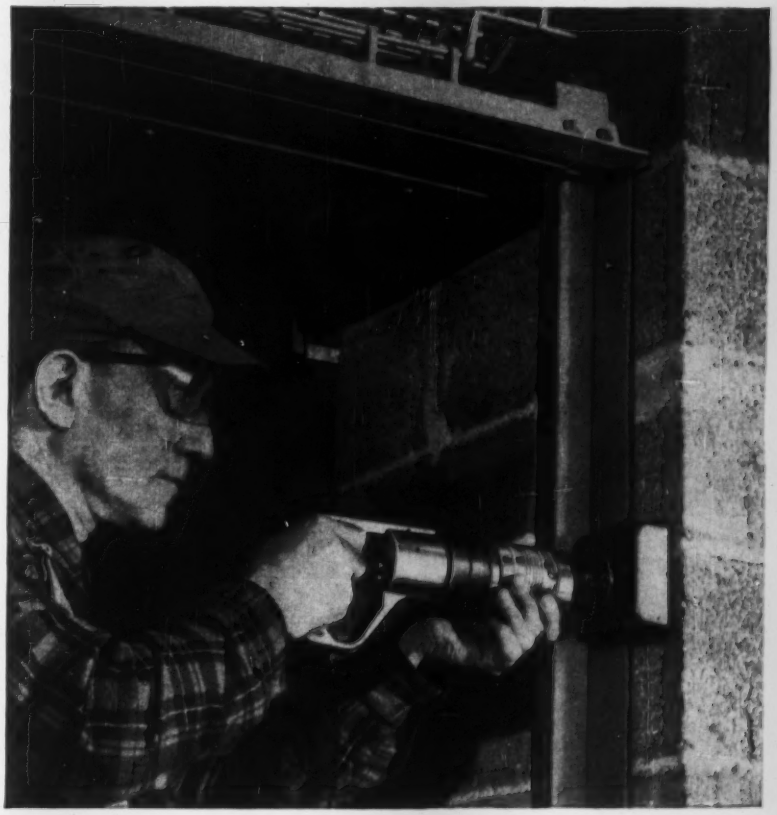
William M. Piatt, 77, Durham, N. C., consulting engineer, died May 1. He was one of the leading consultants in the Southeast on water and sewerage systems. His work was done largely on projects in the two Carolinas and Virginia. He was a past president of the North Carolina section of the American Society of Civil Engineers, the North Carolina Water Works Association and the North Carolina Sewage Works Association. A native of Tunkhannock, Pa., he received his B.S. and M.S. degree in civil engineering from Lafayette College, and in 1899 moved to Winston-Salem, N. C., where he was engaged in civil engineering until moving to Durham in 1909.

Thomas P. Clonts, 74, pioneer Muskogee, Okla., civil engineer, died April 14. Mr. Clonts' career ranged from railroad chainman and waterworks laborer to city manager for Muskogee and head of the Grand River Dam Authority. He supervised construction of bridges over the Arkansas and Canadian Rivers and designed several bridges and dams. At his death, he was an active partner in the firm Engineers, Associated, in Muskogee.

Sir Murdoch MacDonald, 91, British consulting civil engineer who designed the original Aswan Dam in Egypt, died in Scotland April 24. He engineered raising the height of the dam in 1907 and again in 1929. His firm, Sir Murdoch MacDonald & Partners, conducted an extensive survey of the Jordan Valley for the purpose of settling Arab refugees, and submitted several projects to the United Nations.

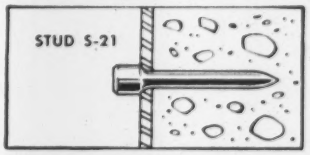
Garner W. Miller, chief engineering assistant, U. S. Army Engineer District, Memphis, is awarded the highest civilian employee performance rating of the Department of Defense for "superior performance of assigned duties" in the execution of the Lower Mississippi River flood-control program during the last 25 years.

Just one of *101* Stud Driver uses!



No outside power source required—

Anchor metal door frames to concrete or cinder block in seconds with the Remington Stud Driver



¼" **Remington S-21 Stud** with 22 caliber Power Load is recommended for the application above . . . no pre-drilling required. There's a special stud to fit your needs, a Power Load to handle the job.

There's no time lost with this cartridge-powered fastening tool! It sets ¼" or ⅜" diameter studs in concrete or steel . . . up to *six* a minute, either size. Barrel change-over takes only 90 seconds *right on the job.* Over 40 Remington Studs to choose from, plus 22 and 32 caliber Power Loads scientifically graded to furnish *exact* power you need. Cuts costs, saves time on light, medium or heavy-duty fastenings!

FREE BOOKLET tells how and where to use the Stud Driver. Clip and mail coupon today for your copy.

Remington

DUPONT

STUD DRIVER

Industrial Sales Div., Dept. ENR-5
Remington Arms Company, Inc.
Bridgeport 2, Conn.

Please send me your free booklet which shows how I can speed the job and save with the Stud Driver.

*Name*_____ *Position*_____

*Firm*_____

*Address*_____

*City*_____ *State*_____

NATIONAL PLUMBING CODE HANDBOOK

JUST OUT! Offers a clear, simple guide to the National Plumbing Code, explaining and illustrating its meaning and intent, paragraph by paragraph, and including much related technical information and data to aid in the design and installation of plumbing, water supply, sewage, and drainage systems that will meet Code standards. **Edited by Vincent T. Manas, Consulting Engr. 503 pages, 389 illustrations, $7.50.**

PUMP SELECTION AND APPLICATION

JUST OUT! From the bare outline of your pumping problem to the completed installation, this book brings you specific recommendations and exact data to save you time and help you secure more for your pumping dollar! Besides fundamental methods, book shows how to handle specific pumping problems in more than a score of industries. **By Tyler G. Hicks, Power Magazine and Cooper Union School of Engrg. 422 pages, 411 illustrations, $8.50.**

ELECTRICAL SYSTEMS DESIGN

JUST OUT! Brings you a complete picture of all that is best in modern practice in the design and layout of electrical systems for power, light, heat, signal systems, and communications. You'll find your every question answered—from specific loads and the circuits to serve them, down to switching and protective arrangements for the incoming power supply. **By J. F. McPartland and the Editors of Elect. Const. & Maint. 140 pages, fully illustrated, $6.00.**

BUILDING AN ENGINEERING CAREER

Brings you helpful guidance in choosing the kind of engineering career in which you will be successful. Plainly and thoroughly explains the scope of each engineering branch, the kind of work involved, the chief accomplishments of each, income and job possibilities, and gives pointers on preparing for such a career. **By C. C. Williams, 3rd Ed. rev. by E. A. Farber, U. of Fla. 297 pp., 60 illus., $4.75.**

SEE THESE BOOKS 10 DAYS FREE

McGRAW-HILL BOOK CO., INC., Dept. NR-5-23
327 W. 41st St., N.Y.C. 36

Send me book(s) checked below for 10 days' examination on approval. In 10 days I will remit for book(s) I keep, plus few cents for delivery costs, and return unwanted book(s) postpaid. (We pay delivery costs if you remit with this coupon—same return privilege.)

- ☐ Manas—**Nat'l Plumbing Hdbk.**, $7.50
- ☐ Hicks—**Pump Selection & Appl.**, $8.50
- ☐ McPartland—**Elect. Systems Design**, $6.00
- ☐ Williams—**B'l'dg an Eng'r'g Career**, $4.75

(PRINT)

Name .....

Address .....

City .....Zone....State.....

Company .....

Position .....

For price and terms outside U. S. write McGraw-Hill Int'l., N.Y.C. NR-5-23

Unit Prices

Oregon Water Line Takes Alternate Bids

Modified prestressed concrete cylinder pipe took this $3 million contract away from the alternate for welded steel pipe. It is for a 89,450 ft water line with river crossings for the city of Salem, Ore. Clark & Groff, Salem, are the consulting engineers.

Let to Lord Bros., Contractors, Portland, Ore., in two sections:

• Section 1, at $1,123,115, is 7.5% below the second low bid and 6.8% below the low bid on the steel pipe alternate (see table). This is a 35,802 ft line of 48 in. pipe. It includes an 82 ft railroad crossing for $13,700 and a 100 ft highway crossing with existing culvert for only $5,000.

• Section 2, at $1,970,076, is 5.7% below the second low bid and 32.4% below the only bid on the steel pipe alternate. (Prices per lin ft were $32 for 54 in. steel pipe, $27 for 48 in. pipe and $20 to $24 for trench excavation.) This is for 53,648 ft of 54 in. and 48 in. pipe with one railroad and six river crossings.

Both alternates offered an option for 54 in. low head reinforced concrete pipe for the upper low pressure section of the pipe line, on which no bids were received.

Bids were taken also on an alternate for 60 in. pipe. The price, $38.20 per lin ft, includes the cost of extra excavation over that required for 54 in. pipe.

River crossings, priced $6,500 for a 95 ft unit to $13,700 for a 266 ft crossing, include the cost for excavation, diversion of water, pipe, concrete cover and backfill. The $51,015 header section includes 112 ft of pipe line with valves and fittings and connections to an existing 36 in. line. Specifications call for steel pipe in the header section regardless the type of pipe selected for the pipe line.

Bidders include:

Station 90 + 48 to Header Assembly Alternate for Prestressed Concrete Cylinder Pipe

1C	Lord Bros. Contractors Portland, Oregon	$1,123,115
2	Morrison-Knudsen Co., Inc., Seattle, Wash.	1,213,903
6	Kuckenberg Const. Co., Portland, Oreg.	1,522,820

Bids: 2-21-57 Items	Unit	Quantity	Unit Prices 1C	 2
Exc, prepare & bkfl	lf	35,620	$4.00	$3.20
Pipe, modif prestr conc cylinder, 48"	lf	35,620	26.00	29.10
Crossing, railroad	ea	1	13,700	13,227
highway	ea	1	5,000	5,150
MH, access, less vault	ea	12	400.00	390.00
Blow-off assemb, 8" type I	ea	7	600.00	800.00
12" type II	ea	1	850.00	1,070
pipe, CI, 8"	lf	180	5.00	11.25
12"	lf	150	8.00	15.30
Air vlv assemb, 2" type I	ea	2	500.00	450.00
4" type IIa	ea	5	650.00	940.00
6" type IIa	ea	1	750.00	1,200
8" type III	ea	1	1,200	1,758
Gate valves, 36"	ea	1	4,005	5,034
Outlet assemblies,				
24", w/gate valve	ea	1	2,800	2,974
20" w/gate vlv & blind flange	ea	1	2,200	2,342
20" w/ blind flange	ea	1	560.00	702.00
Vaults for access MH	ea	11	300.00	365.00
for gate valves	ea	3	300.00	435.00
for air vlv, II&III	ea	6	350.00	475.00
Water stops, concrete	ea	2	400.00	225.00
Bkfl, grav, for unstable areas	cy	200	5.00	5.50
Dished head closure for 42" pipe if this pipe is deleted from contract	ea	1	400.00	440.00

To be completed: 1C 7-1-58 2 8-31-58
Liquidated damages: $250 per day

Alternate for Steel Pipe

1 Salem Sand & Gravel Co., Salem, Oreg.	$1,265,194
2- Kuckenberg Constr. Co., Portland, Oreg.	1,731,370

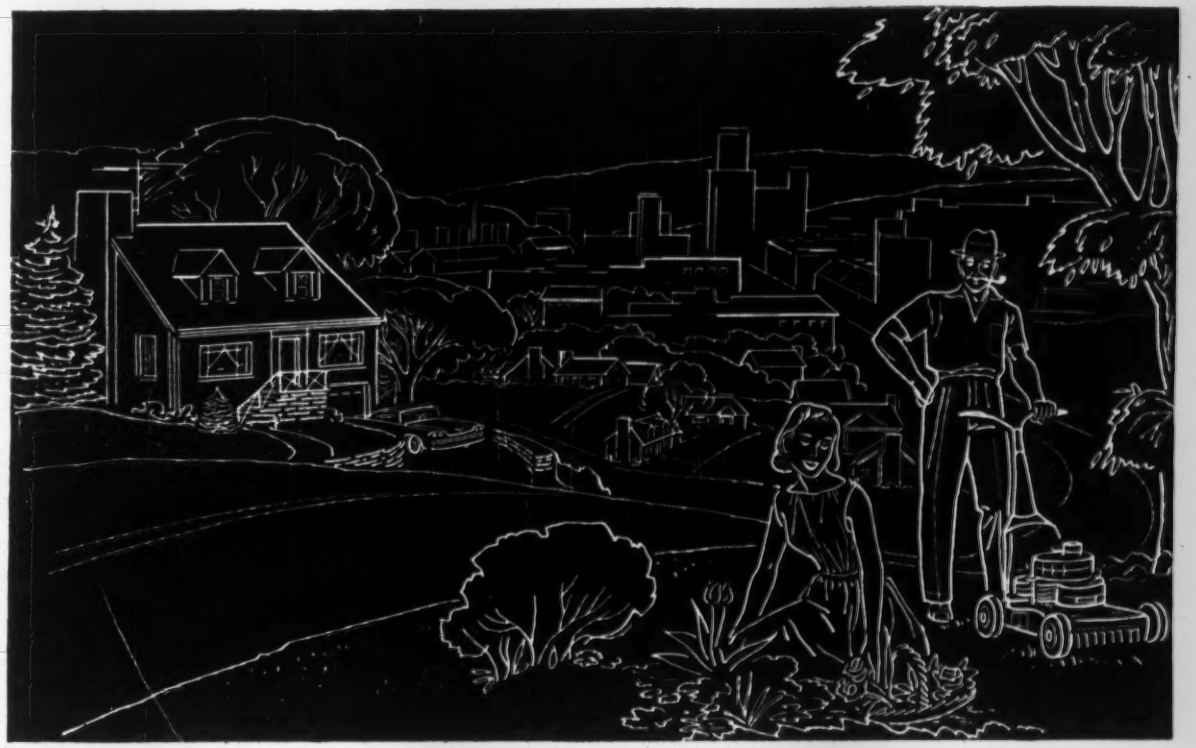
Bids: 2-21-57 Items	Unit	Quantity	Unit Prices 1C	 2
Exc, prepare & bkfl	lf	35,620	$7.70	$20.00
Pipe, weld stl, 48", ¼" plate	lf	35,620	26.50	27.00
Crossing, railroad	ea	1	12,500	10,000
highway	ea	1	4,200	10,000
MH, access, less vault	ea	12	185.00	200.00
Blow-off assemb, 8" type I	ea	7	450.00	200.00
12" type II	ea	1	500.00	250.00
pipe, CI, 8"	lf	180	10.00	6.00
12"	lf	150	12.50	10.00
Air vlv assemb, 2" type I	ea	2	190.00	500.00
4" type II	ea	5	500.00	700.00
6" type II	ea	1	700.00	800.00
8" type III	ea	1	1,000	1,000
Gate valves, 36"	ea	1	4,600	5,000
Outlet assemblies				
24" w/gate vlv	ea	1	2,000	2,500
20" w/gate vlv & blind flange	ea	1	1,600	2,000
20" w/blind flange	ea	1	225.00	200.00
Vaults for access MH	ea	11	240.00	600.00
for gate valves	ea	3	300.00	1,000
for air vlv, II & III	ea	6	400.00	600.00
Water stops, concrete	ea	2	200.00	200.00
Bkfl grav, for unstable areas	cy	200	7.00	5.00
Dished head closure for 42" pipe	ea	1	300.00	1,000

Header Section to Stayton Island Alternate for Prestressed Concrete Cylinder Pipe

1C	Lord Bros. Contractors, Portland, Oregon	$1,970,076
2	Salem Sand & Gravel Co., Salem, Oregon	2,089,218
5	Kuckenberg Constr. Co., Portland, Oregon	2,458,419

Bids: 2-21-57 Items	Unit	Quantity	Unit Prices 1C	 2
Exc, prepare & bkfl				
sta 445+58 to 473+75	lf	2,817	5.00	7.20
sta 473+75 to 887+46	lf	39,055	5.00	6.00
sta 887+46 to 938+00	lf	7,018	5.00	9.20
sta 938+00 to 978+64	lf	3,643	5.00	7.95
Pipe, modif prestr conc cylinder, 48", 100 psi	lf	2,817	27.90	28.90
54", 100 psi	* lf	49,716	29.75	30.75
Header sect assemb, stl pipe	ea	1	51,015	47,500
Crossing assembly, creek				
sta 483+18 to 484+24	ea	1	6,250	6,000
sta 491+50 to 493+00	ea	1	8,550	7,500
sta 525+58 to 528+24	ea	1	13,700	12,000
sta 940+55 to 941+50	ea	1	6,500	4,500
sta 965+88 to 967+05	ea	1	6,700	8,800
sta 974+43 to 976+86	ea	1	13,350	10,400
Crossing assembly, railroad	ea	1	11,075	7,340
MH, access, less vault	ea	17	400.00	350.00
Blow-off assemb, 8" type I	ea	3	950.00	920.00
12" type II	ea	1	1,050	1,100
pipe, CI, 8"	lf	80	5.00	10.00
12"	lf	20	8.00	12.50
Air vlv assemb, 2" type I	ea	1	600.00	140.00
4" type IIa	ea	2	750.00	600.00
Chlorine diffusor assemb incl vent, outlets, meter opening & cover	ea	1	1,500	730.00
Service main conn, std, 8"	ea	1	315.00	375.00
10"	ea	1	350.00	500.00
Vaults for access MH	ea	13	300.00	250.00
for air vlv type II	ea	3	400.00	325.00
for chlor diff assemb	ea	1	4,600	4,000
Water stops, concrete	ea	10	500.00	200.00
Bkfl, grav, for unstable areas	cy	400	6.00	7.00
* Alternate for 60" pipe, sta 882 50 to 978 64	lf	9,612	38.20	38.20

To be completed: 1C 7-1-58 2 7-1-58



the billion-mile network of buried faith

Clay Pipe is trusted. It has to be. It's sealed in by streets and sidewalls . . . blocked off by building foundations . . . piled over with earth and rock.

Clay Pipe has a vital job to do, and it must not fail. Yet—nobody worries about the vast underground network of sanitary protection. Few people even think about it. What greater tribute could be paid to a product's dependability?

Clay Pipe goes underground, so it's got to be good. It guards against disease, so it's got to be good. It gets no maintenance, so it's got to be good.

And you can bet your sewerage bonds it *is* good, because it's backed by a written long-term guarantee. Clay Pipe is the only pipe that *never wears out*, and the Clay Pipe industry is mighty proud of it.

THE PUBLIC *KNOWS* CLAY PIPE IS BEST

Vitrified CLAY PIPE

SAY CLAY PIPE NEVER WEARS OUT!

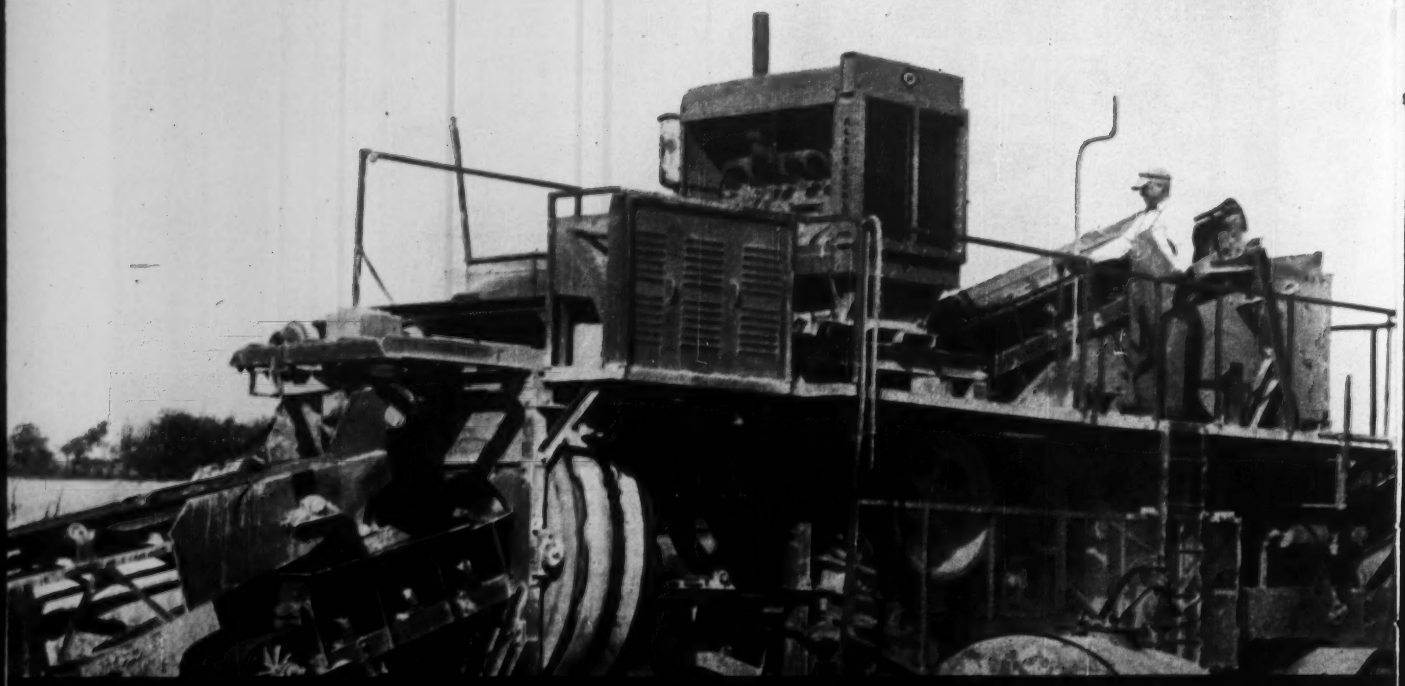
NATIONAL CLAY PIPE MANUFACTURERS, INC.

1820 N. Street, N.W., Washington 6, D.C.

206 Connally Building, Atlanta 3, Georgia
100 N. LaSalle Street, Room 2100, Chicago 2, Ill.
703 Ninth & Hill Building, Los Angeles 15, Cal.
311 High Long Bldg., 5 E. Long St., Columbus 15, O.

"I like it the best of any engine we have had—wish we had one on the shovel," says the job superintendent about the Allis-Chalmers 6DA-844 diesel powering this crusher.

With 30 to 50% fewer moving parts, this Allis-Chalmers diesel...



...PUTS MORE ROCK THROUGH THE CRUSHER

THERE IS UNUSUAL SIMPLICITY in Allis-Chalmers engines. The 6DA-844 diesel shown working above, for instance, *has 30 to 50 percent fewer wearing parts than competitive engines!*

THAT MEANS LESS WEAR . . . LESS THAT CAN GO WRONG when parts are fewer and stronger. Your equipment keeps working; you get more rock through the crusher.

MORE POWER GOES TO WORK with Allis-Chalmers engines — not only because there are fewer moving parts, but because more efficient combustion means maximum power from the fuel.

You can have this simplicity, economy and durability in Allis-Chalmers engines of *any* size or type, 9 to 516 hp — *any* fuel, LP or natural gas, gasoline or diesel — for *any* application. See your Allis-Chalmers dealer for full information. Allis-Chalmers, Buda Division, Milwaukee 1, Wisconsin. 8C-7

ALLIS-CHALMERS *Engineering in Action*

Materials and Labor Prices

Monthly Market Quotations by ENR Field Reporters

See following ENR issues for OTHER PRICES:

- Clay Products, Lime, Plaster, Paint, Roofing: Last, Apr. 25; Next May 30.
- Wage Rates, Building Board, Lath, Insulation: Last, May 2; Next May 30
- Cement Aggregates, Ready-mixed Concrete, Asphalt: Last, May 9; Next June 6
- Iron & Steel Products, Pine: Last, May 16; Next June 13.

LUMBER, TIMBER, PLYWOOD—PER M FT., B.M., CARLOAD LOTS F. O. B.

SOUTHERN PINE AND DOUGLAS FIR

All Southern Pine is No. 2 common or better and for No. 1 N. C. Box. (Prices in Bold Face)

All Fir boards, dimensions, planks No. 2, Fir small timbers and timbers are No. 1. Lengths up to 20 ft. (Prices in italics)

	1x6 s4s	1x8 s4s	2x4 s4s	2x6 s4s	2x8 s4s	2x10 s4s	3x12 Rgh	6x12 Rgh	12x12 Rgh	LONG LEAF Y. P. Merchantable grade up to 20 ft. 2x12 Rgh	12x12 Rgh	PLYWOOD Rail freight increment (See note for base price) 3/8"	1/2"
Atlanta †	$83 00	$88 00	$77 50	$76 00	$87 00	$95 00	$150 00					$22 32	$27 24
Baltimore *	92 00	96 00	98 00	98 00	98 00	102 00	114 00			$170 00	$185 00	25 92	31 60
	97 50g	*105 00g*	*123 00g*	*123 00g*	*123 00g*	*133 00g*	*153 00g*	*$114 00*	*$114 00*				
Birmingham †	87 00	89 00	82 00	89 00	92 00	97 00	112 00			115 00	160 00	21 78	26 58
	108 50	*108 50*	*105 00*	*108 00*	*108 00*	*115 00*	*111 50*	*108 50*	*108 50*				
Boston ‡	99 00f	99 00f	105 00f	105 00f	105 00f	116 00x						25 92	31 60
	97 00n	*97 00n*	*114 00*	*114 00*	*114 00*	*126 00*	*135 00*	*131 00*	*135 00*				
Chicago **	94 00	97 00	91 00	105 00	113 00	114 00	109 00			137 00	137 00	22 45	27 37
	105 00	*105 00*	*138 00*	*116 00*	*116 00*	*117 00*	*135 00*	*125 00*	*125 00*				
Cincinnati *	96 00	97 25	87 00	93 25	98 00	106 00	119 50			141 75	141 75	25 00	30 48
	99 25	*99 50*	*104 00*	*106 00*	*107 00*	*116 50*	*152 00*	*152 00*	*152 00*				
Cleveland **	94 00	95 00	99 00	97 00	97 00	97 00						25 37	30 93
			116 00	*108 00*	*108 00*	*108 00*	*136 00*	*136 00*	*136 00*				
Dallas k‡	68 00	70 00	65 00	65 00	65 00	70 00	135 00			130 00	125 00	18 72	22 80
Denver *	*Not in stock*		*121 50*	*121 50*	*121 50*	*126 00*	*140 50*	*147 50*	*152 50*			13 92	16 98
Detroit ‡	118 50	119 50	114 00	117 00	122 00	127 00				130 00		25 00	30 48
	125 00	*125 00*	*130 00*	*132 50*	*130 00*	*135 00*	*185 00*	*195 00*	*195 00*				
Kansas City 3	120 00	120 00	120 00	120 00	120 00	135 00						16 56	20 16
	120 00	*120 00*	*120 00*	*120 00*	*120 00*	*130 00*	*165 00*	*185 00*	*210 00*				
Los Angeles 1	*95 00*	*95 00*	*95 00*	*95 00*	*95 00*	*95 00*	*119 00*	*150 00*	*150 00*			16 61ab	20 25ab
Minneapolis #	*135 00*	*135 00*	*140 00*	*140 00*	*140 00*	*140 00*	*185 00*	*185 00*	*185 00*			19 99	24 25
Montreal ab	94 00	103 00	94 00	95 00	113 00	130 00				125 00	125 00		
	180 00	*180 00*	*180 00*	*180 00*	*180 00*	*180 00*	*171 00*	*171 00*	*171 00*				
New Orleans †	87 00	87 00	91 00	91 00	90 00	97 00	121 50			151 00	151 00	18 72	22 80
	110 00	*110 00*	*106 50*	*120 00*	*120 00*	*130 00*	*152 50*	*152 50*	*152 50*				
New York 3	108 00	109 00	118 00	119 00	119 00	124 00				245 00	260 00	25 92	31 60
			118 00	*121 00*	*121 00*	*132 00*	*165 00*	*165 00*	*165 00*				
Philadelphia ‡		Range from $117.00 to $137.00				117 137	117 137			214 224	214 224	25 92	31 60
		Range from $131.00 to $165.00				*131 165*	*136 158*	*165 00*	*165 00*				
Pittsburgh 2	130 00	140 00	130 00	155 00	140 00	145 00				155 00		25 92	31 60
	130 00	*140 00*	*130 00*	*155 00*	*150 00*	*145 00*		*200 00*	*200 00*				
St. Louis #	118 00	120 00	128 00d	128 00d	128 00e	133 00e						18 72	22 80
			135 00	*195 00e*	*135 00e*	*150 00e*	*195 00e*	*195 00*	*195 00*				
San Francisco A	*80 00*	*80 00*	*83 00*	*83 00*	*83 00*	*85 00*	*115 00*	*125 00*	*150 00*			12 22	14 91c
Seattle †	*65 00*	*75 00*	*73 00*	*73 00*	*73 00*	*74 00*	*90 00*	*90 00*	*95 00*				
Toronto a	98 00	100 00	95 00	98 00	100 00	100 00				102 00			
	114 00	*114 00*	*130 00*	*122 00*	*130 00*	*130 00*	*145 00*	*150 00*	*150 00*				

† F.o.b. mill. * F.o.b. city, CL, out of yard. ** F.o.b. city, CL, direct mill shipment. ‡ Deliv. to contr. CL. 1. Retail, LCL, at yard. # Retail, LCL, deliv. 2. Deliv. truck lots. 3. asd., truckload lots, 8/8 Mftbm

LUMBER: Bold Face Type, Southern Pine. Italics, Douglas Fir. *a Spruce. *b Tax exempt. *c 5M lots. *d 8, 10, & 12 ft. lengths. *e 8 to 16 ft. lengths. *f Hemlock *g No. 1 common. *j 8ft. lengths. *k No. 3 common. *n #3. A Incl rail rate from North west mills to San Francisco are $11.80 to $18.00 per M ft. bm. From Northern Calif. mills $9.00 by rail, $9.50 by truck. All rates for surfaced stock. For rough, add $3.00 to above figures.

PLYWOOD: Interior Fir Plywood, 4' by 8' panels, 5-ply, sanded 2 sides, water resistant glue, carload lots, delivered per 1,000 sq. ft. surface. Seattle base price on 3/8", $152.00; on 1/2", $170.00. Exterior 3/8", $156.00, 1/2", $174.00. For other centers add rail freight increment from table on proper size. Oiling and edge sealing charges included. *a Lower rate by water shipment. *b 80,000 lb. minimum.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS: Discounts from jobbers list, Feb. 1, 1950a Single or Double Strength A quality	B quality	EXPLOSIVES: Per lb. 40% Ammonia Gelatin in 50 lb. cases delivered in 200 lb. lots*
Atlanta	78%c	78%e	$0 2540
Baltimore	74%d	76%d	.2540
Birmingham	82%	83%	.1990
Boston	72–10%	72–10%	.2540
Chicago	72%	72%	.2540
Cincinnati	74%	74%	.2540
Cleveland	74–2–10%	74–2–10%	.2940
Dallas	75%	75%	.2615
Denver	73%	73%	.2590
Detroit	74–10–10%	74–10–10%	.2540
Kansas City	76–10%	76–10%	.2590
Los Angeles	70%	76%	.2585
Minneapolis	71–10%	71–10%	.2590
Montreal	40–10–5%bc	40–10–5%b	22.05h
New Orleans	75%	76%	.2590
New York	79–10%	79%	.4425g
Philadelphia	74–10%	76–10%	.2540
Pittsburgh	73%	73%	.2540
St. Louis	72–10–10%	72–10–10%	.2590
San Francisco	60%	72%	.2540
Seattle	67%	70%	.2565

Price of 60% Ammonia Gelatin is $0.15 per lb. higher than 40% in U. S., $1.75 per 100 lbs. higher in Canada.

Glass: *a Jobbers' list price per box, 14 x 20, ss, $42.75 for A quality, $37.50 for B quality; 14 x 20, ds, $60.00 for A quality, $52.75 for B quality. *b Discount from list, Apr. 1951; sales tax included, but 8% tax exemption not allowable for. *c 77% for single strength *d Discount 8/18/52. *e 77% for double strength

Explosives: * Cartridges of 1 1/4", 1 1/2", 1 3/4", 2", 2 1/2", 2 3/4", 3" diameters. Urban prices influenced by service charges or local storage and delivery regulations do not consistently reflect quantity prices in less congested areas. *g In borough of Kings, Queens, and Richmond and in Manhattan south of Canal St., add delivery charge of $20.00 per trip. *h F.o.b Beloeil (near Montreal), per 100 lb. forcite, 40%. Forcite 60%, $23.80

40% Ammonia Gelatin price ranges in other than urban areas, per lb. (except Seismograph Grades)

	C/L 20,000 lb. net	Tons	200 lb. lots
E. of the Miss., except Fla. and Me.	$0.1990	$0.2340	$0.2540
W. of Miss. to Rocky Mtn. States, Fla. and Maine	.2040	.2390	.2590
Rocky Mtn. States	.2040	.2390	.2590
Pacific N. W. States	.2015	.2365	.2565
Pacific S. W. States	.1990	.2340	.2540

PILES, TIES F. O. B.

PILES

Prices per linear foot, fir and pine, bark off, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine based on freight from Norfolk.

Dimensions	Points	Length	By Rail: Pine*	Fir
12-in. at butt	6-in.	30 to 50-ft.	$0 51	....
12-in.—2-ft. from butt	6-in.	50 to 59-ft.	.54	....
12-in.—2-ft. from butt	6-in.	60 to 69-ft.	.58	....
12-in.—2-ft. from butt	6-in.	90 to 100-ft.	....	....
13-in.—3-ft. from butt	5-in.	91 to 100-ft.	....	....
14-in.—2-ft. from butt	6-in.	50 to 69-ft.	60/68	....
14-in.—2-ft. from butt	6-in.	70 to 79-ft.	73/ 88	.98
14-in.—2-ft. from butt	5-in.	80 to 85-ft.	83/93	.94
14-in.—2-ft. from butt	5-in.	85 to 89-ft.	....	1.00
14-in.—2-ft. from butt	5-in.	90 to 100-ft.	....	1.03

* Pine piling over 80-ft. available only in limited quantities

RAILWAY TIES

Prices f.o.b. per tie for carload lots:

		8" x 8" x 8' Untr.	8" x 8" x 8' Tr.	7" x 9" x 8'6" Untr.	7" x 9" x 8'6" Tr.
Birmingham*	Hardwood, Grade 3	$1 70	$2 55	Gr. 5 $2 25	$3 33
	Grade 2	1 50	2 35	" 4 2 10	3 18
	Grade 1	1 15	2 00	" 3a 1 70	2 78
Chicago	Red Oak		4 00x		4 60x
New York	S. L. Sap Pine	2 00d	4 00d	3 00g	6 00g
	Mixed Oak	2 50d	4 50d	3 50g	6 50g
Philadelphia	Red Oak	2 95/3 15	4 50/4 70	3 80/3 90	5 50/5 75
St. Louis	White Oak	2 65		2 95	
	Red Oak	2 55	3 25a	2 80	3 60a
San Francisco	Douglas Fir	2 00ef	2 90ef	2 84ilef	4 31cef

Tr.—Treated; Untr.—Untreated. a Creosoted. b 7" x 9" x 8'. c Empty call d 6 x 8 x 8'6" e Green. f f.o.b. cars. g 7 x 9 x 8'6" * Add 75¢/tie freight charge to Birmingham.

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder in drums f.o.b. works, per 100 lb.	$5 02
Chlorine cylinders, liquid, per lb. f.o.b. works	103
Calcium chloride, 77–80%, flaked, 100-lb. paper bag, f.o.b. works, ton	29 00
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb.	2 30
Soda ash, 58%, in paper bags, per 100 lb. dense	1 70
Sulphate of aluminum, commercial, in 100-lb. bags f.o.b. works	1 85
Sulphate of copper, in bags, 99% per 100 lb. f.o.b. works	14 90

NOW

Stran-Steel offers a complete lightweight

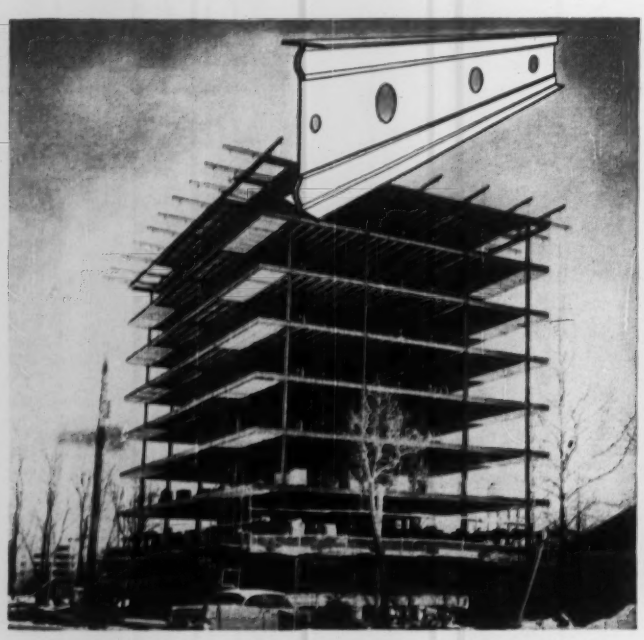
joists, studs, columns, decking

Stran-Steel now offers a complete structural system with fully integrated components—nailable joists and studs, structural columns and beams, roof decking and the beautiful new metal curtain wall panels with *Stran-Satin* finish.

Stran-Steel's complete structural system brings these advantages to the architect and owner:

VERSATILITY—Many structural variations are possible with this versatile system in the design of walls, roofs, partitions, canopies, floors, even entire buildings. A few are illustrated below.

ECONOMY—Savings in the use of steel architectural products mean more economical construction, resulting in lower bids to fit budget limitations.



Eight-story luxury-type apartment building, New York City. Builder: Alfred Levitt.

New Maximlite-designed Northeast Elementary School, Findlay, Ohio. Design by: John Auferoth.

NAILABLE JOISTS AND STUDS—Stran-Steel joists are light gage steel members formed from strip steel and welded back to back to form the special nailing groove. They provide a non-combustible, economical and permanent framing system to which collateral materials can be quickly and easily applied. Available in 6″, 8″, 9″, 10″ and 12″ depths and in gages of 12, 13, 14 and 16. This range of depths and gages satisfies almost any load requirement.

The distinctive nailing groove permits rapid installation of collateral materials. Ordinary nails can be used and tightly clinched in a grip of steel, yet can be readily removed with a claw hammer.

STRUCTURAL COLUMNS AND BEAMS—Stran-Steel cold formed members are "C" section shapes and are available in special steel having a yield of 40,000 p.s.i. These sections are manufactured in a variety of sizes and can be used in many combinations as structural columns and beams. Stran-Steel cold formed sections are strong and durable, yet provide weight-saving and cost-saving economies. They are available in 8″, 10″, 12″ and 14″ sizes and gages ranging from 6 to 14.

NEW WIDE FLANGE STRUCTURAL SHAPES—Eight choices of wide flange I-section structural shapes are now available: Two with 6″ flange, 8.62″ and 9.62″ in depth; six with 8″ flange, ranging from 8.75″ to 12.75″ in depth.

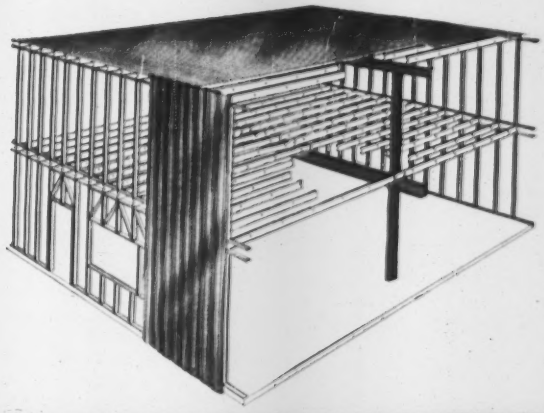
see our catalog in S ARCHITECTURAL FILE or write for copy

Here's where to obtain more information:

Atlanta 3, Ga., 206 Volunteer Bldg.; **Chicago 6, Ill.,** 205 W. Wacker Dr.; **Cleveland 16, Ohio,** 20950 Center Ridge Rd.; **Detroit 29, Mich.,** Tecumseh Rd.; **Houston 5, Texas,** 2444 Times Blvd.; **Kansas City, Mo.,** 6 East 11th St.; **Minneapolis 4, Minn.,** 708 S. 10th St.; **New York 17, N.Y.,** 405 Lexington Ave.; **San Francisco 3, Cal.,** 1707 Central Tower Bldg.; **Washington 6, D.C.,** 1025 Connecticut Ave., N. W.

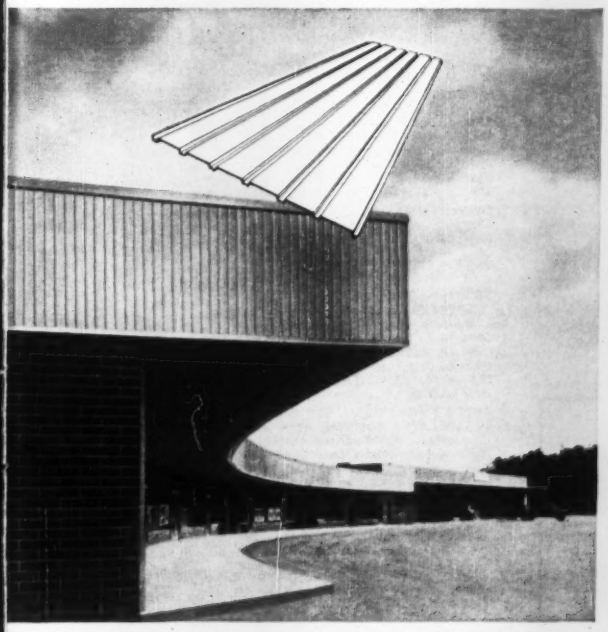
structural system—

and curtain wall

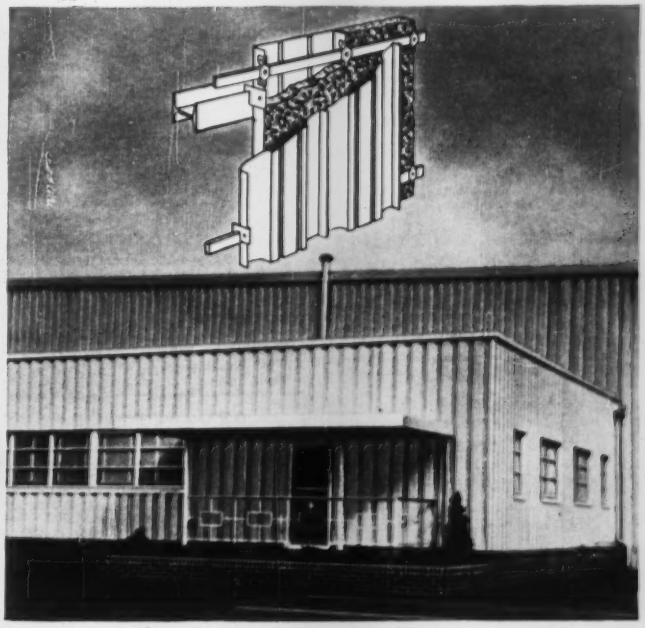


STRENGTH—Stran-Steel nailable joists, for example, have a yield point of 40,000 p.s.i., approximately 20% higher than that of most commercial mild steel. This extra-strength weight advantage prevails throughout the range of these products.

Stran-Steel products are ideal for schools, apartments, shopping centers and industrial plants.



Cleveland's Parkland, $50,000,000 residential and shopping community. Project developer: Don Loftus. Architect: Wm. E. Harris.



Large, modern warehouse, Oakland, California. Owner: Bigge Drayage Co. Engineers: D. Y. Long Co.

RIBBED ROOF DECK—Stran-Steel galvanized ribbed deck is designed primarily for use with Stran-Steel joists. However it is also useful as sidewall skin in certain applications. Two types are available:

1. Lightweight, nailable roof deck with ribs on 4" centers. Available in 22, 24 and 26 gage, live load carrying capacities range from 32 to 206 p.s.f., depending on gage, with spans from 2′ to 4′.
2. Heavier roof deck for longer spans has ribs on 6" centers. Available in 18, 20 and 22 gage. Live load carrying capacities range from 12 to 267 p.s.f., depending on gage, with spans from 3′ to 9′6".

CURTAIN WALL—Stran-Steel curtain wall, made of exclusive *Stran-Satin* panels, combines a satin-smooth surface free of bright spangles along with the permanent protection of a non-corrosive zinc coating. It provides the low cost of steel with the eye appeal of far more expensive materials.

Stran-Steel curtain wall consists of two basic panels, insulation and concealed fasteners. This wall is quickly assembled on the job simply by using a button punch. Panels are never pierced or marred by bolts, screws, rivets or holes. Curtain wall panels are available in 18, 20, and 24-gage steel, in lengths up to 54 feet.

Stran-Steel Corporation, Detroit 29, Michigan

☐ Please send me your new Structural Systems Catalog

☐ Please have your representative contact me

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

57-SS-15A

Stran Steel

STRAN-STEEL CORPORATION

Detroit 29, Michigan • Division of

NATIONAL STEEL CORPORATION

Construction Reports

Bids Asked—Low Bidders—Contracts Awarded—First Section—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
J. A. MAHONEY, M. WETZEL, M. E. SCIORRA, Reports
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

HEAVY CONSTRUCTION—BA

† **Vt., Burlington**—SHELTER—BA 5/29—U. S. Eng., 150 Causeway St., Boston, Mass., A/C shelter with electric service, Ethan Allen Air Force Base, ENG-19-016-57-214. $600,000-$700,000. Plans deposit $15.

BUILDINGS—BA

▲ **Conn., Greenwich**—SCHOOL—BA 5/28—Bd. Educ., Greenwich, Central Junior High School, Stanwich Rd. $2,200,000. CD 6/27/56.

▲ **Conn., Hamden**—SCHOOL—BA 6/6—Bd. Educ., Town Hall, Junior High School, Washington Ave. $2,400,000. Plans deposit $125. CD 4/24, under LB.

▲ **Conn., Glastonbury**—SCHOOL—BA 6/7—Building Comm., Academy School, Main St., Hebron Ave. Elementary School. $1,600,000. Plans deposit $50. CD 2/19, under LB.

HEAVY CONSTRUCTION—LB & CA

▲† **Merritt-Chapman & Scott Corp.**, 10 Village St., East Hartford, Conn., CA **$6,904,574**, est. $7,116,126, Ball Mountain Dam, etc., West River, Jamaica-Londonderry, VERMONT. U. S. Eng., 150 Causeway St., Boston, Mass. Bids Apr. 23. CD 4/25, under LB.

▲ **MASSACHUSETTS**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,

Marinucci Bros. Co., Inc., 51 Ceylon St., Dorchester, Mass. CA **$5,729,384**, est. $6,406,649. South East Expressway Section 5-U355 (1) Braintree and Quincy. CD 4/25, under LB.

BUILDINGS—LB & CA

Consolidated Constructors, Inc., 807 Congress St., Portland, Me., LB **$649,776**, est. $650,000. Proj. NH56-C-204,-A6 ELEMENTARY SCHOOL, Horne St., DOVER, N. H. City, School Dist. Union No. 11, Bldg. Comm., Dover, N. H. Bids May 7. CD 5/2.

▲† **Davison Constr. Co., Inc.**, 1306 A Elm St., Manchester, N. H., CA **$15,298,000**. family HOUSING (Capehart) Portsmouth Air Force Base, IFB 27-604-57-3, PORTSMOUTH, N. H. Purch. & Contg. Officer, Air Force Base, Portsmouth, N. H. Bids Mar. 19. CD 3/22, under LB.

▲ **M. S. Kelliher Co.**, 294 Washington St., Boston, Mass. LB **$1,554,000**, ELEMENTARY SCHOOL, Rice Franklin Dist., BOSTON, MASS., City, Dpt. School Bldg. 26 Norman St., Boston, Mass. Bids May 9. CD 4/23.

St. Paul Constr. Co., 1440 Beacon St., Brookline, Mass., Separate Contracts, Approx. **$700,000**, HOTEL-MOTEL, Worcester Turnpike, at Hammond Pond Parkway, NEWTON, MASS. Hotel Corporation of America, lessee. CD 5/1.

▲ **Tornabene Bros. Co.**, 170 Beedham St., Newton Upper Falls, Mass. LB **$1,113,000**, HOSPITAL BLDG., STOUGHTON, MASS. Goddard Memorial Hospital, Brockton, Mass. CD 4/22.

▲ **School Bldg. Com.**, Town Hall, Guilford, Conn., rejected bids Mar. 26, HIGH SCHOOL, GUILFORD, CONN., LB **$1,217,000**. CD 4/23, under LB.

J. L. Marshall & Sons, Inc., 560 York Ave., Pawtucket, R. I., CA **$875,943**, Dayville Elementary SCHOOL, Dayville, KILLINGLY, CONN. Town of Killingly, Town Hall, Killingly, Conn. Bids Mar. 23, awarded May 6. CD 4/5, under LB.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

▲ **N. J., Somerville**—BA 5/28—Somerset-Raritan Sewer Auth., Somerville, primary sewage treatment plant and sewerage sys. to connect with American Cyanamid secondary plant, Bridgewater, Raritan and Somerville. $3,000,000-$3,500,000. Whitman, Requardt & Assocs., 1304 St. Paul St., Baltimore, Md., engrs. CD 1/25.

BUILDINGS—BA

▲ **Pa., Phila.**—HOSPITAL—BA 5/28—Presbyterian Hospital, 51 N. 39 St. (selected list of bidders) 6 story brick, steel hospital addn., $1,500,000. Chatfield & Schlicker, 319 W. Chelten Ave., Phila., archts. Widdicombe Eng. Co., 117 S. 17 St., engr. CD 10/13/55.

▲ **Pa., Willow Grove**—SCHOOL—BA 6/4—Upper Moreland Twp. School Dist., Willow Grove, high school. $3,000,000. Heacock & Platt, 1505 Race St., Phila., archts. Allanbach & Renis, Inc., 16 S. Broad St., Phila., engr. CD 4/29.

▲ **Pa., Phila.**—RECEPTION CENTER—BA 6/10—Dpt. Procurement, City Hall Annex, Phila., Bid 4963 to 4970, children's reception center and outside utilities. $1,250,000. Extended date. Bellante & Clauss, 1810 Rittenhouse Sq., Phila., archts.-engrs. CD 4/1.

HEAVY CONSTRUCTION—LB & CA

N. R. Corbisello, Inc., 36 Tompkins St., Binghamton, N. Y., CA **$878,940**. Contr. 34, Richards Landing Dike, Spec. PA-11026, St. Lawrence, NEW YORK. The Power Auth. of the State of New York, 270 Broadway, New York, N. Y. Bids May 1. CD 5/3, under LB.

PENNSYLVANIA—State Hy. Dpt., 506 H. Office Bldg., Harrisburg,

Thomas A. Mekis, R. D. 2, Valencia, Pa., CA **$524,703**. constr. 26,376 ft. crushed aggreg. base with bit. surf. 20 ft. wide, 2 bridges, Pleasantville Boro, Oil Creek and Allegheny Twps. T.R. 36. Venango Co. Bids Apr. 12, awarded May 7. CD 4/18, under LB.

† **N. B. Alexander & Son, Inc.**, 315 Vaughn St., Harrisburg, Pa., LB **$855,558** (15 bidders) central heating plant, Olmstead Air Force Base, ENG-18-020-57-33, MIDDLETOWN, PA. U. S. Eng., 24 St. and Maryland Ave., Baltimore 18, Md. Bids May 2. CD 4/29.

† **W. Harley Miller**, Martinsburg, W. Va., LB **$684,994** (10 bidders), ammunition storage facilities, ADC type, ENG-49-080-57-80-(78), ANDREWS AIR FORCE BASE, MD. U. S. Eng., First and Douglas Sts., N.W., Wash. 25, D. C. Bids May 7. CD 4/15/57.

BUILDINGS—LB & CA

▲ **Crown Haven Homes**, c/o Stanley H. Klein, archt., 89-31 161 St., Jamaica, N. Y. Owner Builds, **$4,500,000**. 270 HOUSES on tract at Newbridge and Merrick Rds., BELLMORE, N. Y.

Albert C. Vitale, 215 N. 12 St., Kenilworth, N. J., Owner Builds, **$600,000**. 40 HOUSES to be known as Carolyn Homes, Neck Lane, ELIZABETH, N. J. Stephen Potter, 410 Colonial Ave., Union, N. J., and Peter Grygotis, 306 Aldene Rd., Roselle, N. J., archts.

▲ **Advertising Arts Corp.**, 1775 Broadway, New York, N. Y. Owner Builds. **$5,000,000-$6,000,000**. 232 HOUSES on Lucarelli Tract off Park Ave., Morristown Twp., MORRISTOWN, N. J.

▲ **Rice & Weidman, Inc.**, Box 1517, Lancaster, Pa., LB **$1,476,000**. general contract (3 bidders) SECONDARY SCHOOL for Unionville-Chadds Fort Joint School Bd., KENNETT SQUARE, PA. Pub. School Bldg. Auth., 101 S. 25 St., Harrisburg, Pa. Bids May 7. CD 4/18.

SOUTH

BUILDINGS—BA

▲ **Fla., Pahokee**—HOUSING—BA 6/4—Pahokee Housing Auth., Inc., J. W. Vann, dir., Box 918, Pahokee, low-rent housing proj., Incl. 113 units. John Stetson & Assocs., 217 Peruvian Ave., Palm Beach, archts. James N. Borowski, Murray Bldg., Palm Beach, struc. engrs. John T. Pickett, Pahokee, civil engr. CD 5/13, under LB.

HEAVY CONSTRUCTION—LB & CA

▲ **VIRGINIA**—Commonwealth of Va., Dpt. Hys., Central Hy. Office Bldg., 1221 E. Broad St., Richmond;

Va.—**Faulconer Constr. Co.**, Box 236, Charlottesville, Va. CA **$1,097,682**, b. conc. and 2 bridges 5.84 mi. Rte. 297 State Proj. 5915-040-5-06, 07-08-09, S-7 (3), S-SG-7 (4) Campbell Co.;

Va.—**Talbott-Marks Co., Inc.**, Box 308, Clarksville, Va. CA **$1,601,009**. c. conc. and 5 bridges 2.53 mi. Route 401, 8040-0708-09, 10-11-14, I-201-1 (1) Greensville Co. Bids Apr. 24. CD 5/1, under LB.

▲ **FLORIDA**—State Rd. Dpt., Tallahassee,

rejected bids July 12, structures across Big Sarasota Pass, SR 789, State Proj. Job 1715-175, Sarasota Co., LB **$1,037,338**. Will re-advertise. CD 7/19/56, under LB.

▲ **FLORIDA**—State Rd. Dpt., Tallahassee,

R. H. Wright & Son, Capelett Bros. Inc., Andy's Truck Service, Inc., Joe Daniel, Inc., & Seminole Quarries Inc., Fort Lauderdale, Fla. CA **$2,705,578** limerock base, b. conc, 2 dual bridges, 1 single frontage road bridge, 6 span frontage road crossover bridges 11.636 mi. SR 826, Job 8726-103, Dade Co. Bids Mar. 7, awarded May 3. CD 3/13, under LB.

† **Cooper Constr. Co., Box 8124, Jacksonville, Fla.** LB **$523,910**, Item No. 1, commissioned officers' mess (open) and swimming pool, Naval Air Station, Cecil Field, NBy 8672, Spec. 8672/56, JACKSONVILLE, FLA. P. Wks. Officer, Sixth Naval Dist., Bldg. 13, U. S. Naval Base, Charleston, S. C. Bids Apr. 30. CD 4/22.

▲ **LOUISIANA**—State Hy. Dpt., Baton Rouge,

Boh Brothers Constr. Co., 2400 Cypress St., New Orleans, La., LB **$2,609,007**. approach to Mississippi River (Pontchartrain Expressway) 0.49 mi. substructure, concrete deck, connecting ramps etc. Rte. 3019, Proj. 283-08-10, FAP FU-409 (10) **N. O. Orleans Parish.** Bids May 8.

† **Guthrie Electric Constr. Co.**, Box 599, Shreveport, La., CA **$627,218**; electrical distr. and street lighting, U. S. Naval Auxiliary Air Station, NBy 6396, NEW IBERIA, LA. Eighth Naval Dist., Bldg. 16, Naval Station, Algiers, La. Bids Apr. 23, awarded May 2. CD 5/3, under LB.

BUILDINGS—LB & CA

▲ **Pahokee Housing Authority, Inc.**, J. W. Vann, dir., Box 918, Pahokee, Fla., rejected bids Apr. 25, Proj. 21-1 and 21-2, low-rent HOUSING, PAHOKEE, FLA. LB **$1,389,000**. CD 5/1, under LB.

▲ **Clarke Stewart & Wood**, 328 Georgetown St., Lexington, Ky. LB **$1,058,913**. MEDICAL CLINIC BLDG., LEXINGTON, KY. Lexington Building Corp., N. Upper St., Lexington, Ky. Bids May 1. CD 4/25.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

ILLINOIS—BA 5/29—Illinois State Toll Hy. Comn., 20 N. Wacker Dr., Chicago,

Contr. E-1-B, grading, drainage, paving, appurtenances erecting concrete and concrete arch bridges 0.39 mi. W. of State Rte. 31 extending easterly E. of State Rte. 25 near Aurora, Kane Co. $500,000. Vogt, Ivers, Seaman & Assoc., 20 N. Wacker Dr., Chicago, section engrs. CD 5/11/56.

BUILDINGS—BA

O., **Coventry**—SCHOOL—BA 6/3—Coventry Local School Dist., 1135 Portage Lakes Dr., Akron; Robert M. Erwine Junior High School addn. $550,000. Plans deposit $50. Wagner & Luxmore, 200 Permanent Bldg., Akron., archts. CD 11/12.

▲ **Mich., Detroit**—WAREHOUSE, etc.—Bids Asked—General Electric Appliance Co., 8300 Woodward St., (selected list of bidders), warehouse and sales bldg. $1,200,000. Harley Ellington & Day, 153 E. Elizabeth St., Zone 1, archts. CD 12/3.

BUILDINGS—SLC

Ind., **South Bend**—EDUCATIONAL—1st Methodist Church, 325 N. Main St., soon lets contract 3 story educational bldg., 327 N. Main St. $500,000. Forest R. West, 230 W. Washington St., archt. CD 6/13.

▲ O., **Wickliffe**—SEMINARY—Catholic Diocese of Cleveland, 1027 Superior Ave., **Cleveland, Zone 14, soon** lets contract Borromeo Minor Seminary addns. $1,500,000. Stickle & Assoc., 2422 Prospect Ave., Cleveland, Zone 15, archts. CD 3/20.

HEAVY CONSTRUCTION—LB & CA

Concrete Contractors, Inc., 2242 N. 35 St., Milwaukee, Wis., CA **$624,000**. reconstr. center section of 6 St. Viaduct, MILWAUKEE, WIS. City, City Hall, Milwaukee, Wis. Bids May 1, awarded May 3. E. A. Schmidt, Milwaukee, Wis., city engr. G. C. Ashton, Milwaukee, Wis., bridge engr. CD 4/14/43.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction
(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England — **Middle West**
Middle Atlantic — **West of Mississippi**
South — **Far West**

PROPOSED WORK
Water Supply — **Public Buildings**
Sewers, Waste Disposal — **Mass Housing**
Bridges — **Commercial Buildings**
Streets & Roads — **Industrial Buildings**
Earthwork, Waterways — **Unclassified**

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
SOON LETS CONTRACT: SLC
LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.
CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.
CD dates shown are of Construction Daily Issue in which last previous report was published.
OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

† Federal Government
▲ Project of $1,000,000 or over.
ENR Engineering News-Record
CD Construction Daily
For additional reports see Construction Daily.

BUILDINGS—LB & CA

▲ **Sam W. Emerson Co.**, 1836 Euclid Ave., Cleveland 15, O. CA Est. **$1,400,000.** three VALVE PLANT addns., 1459 E. 195 St., CLEVELAND, O. Thompson Products Co., 23555 Euclid Ave., Cleveland 17, O. Dalton & Dalton, The Arcade, Cleveland 14, O., archts. CD 1/11/51.

Krause & Pagura, Inc., 1059 Cable Rd., Columbus, O., CA **$937,508** general and electrical work, 1,000 pupil Linmoor JUNIOR HIGH SCHOOL, COLUMBUS, O. Bd Educ., 270 E. State St., Columbus, O. CD 12/11.

Leonard H. Krill Co., 2169 E. 33 St., Cleveland 15, O., CA **$990,000.** 54,000 sq. ft. MANUFACTURING PLANT addn., E. 222 and Euclid Ave., EUCLID, O. Motch & Merryweather Machinery Co., Penton Bldg., Cleveland 15, O. Joseph Ceruti & Assoc., 7113 Euclid Ave., Cleveland 3, O., archts.

▲ **CEE-BEE, Inc.**, 88 Surry Rd., Mansfield, O., Own Forces **$3,000,000-$4,000,000.** 237 National HOMES, Westwood Park MANSFIELD, O.

▲ **Suburban Quality Builders, Inc.**, Wm. J. Racek, pres., 4000 Warrensville Center Rd., Cleveland 22, O., Own Forces, **$1,375,000.** 50 ranch-type HOMES, Bainbridge Rd., SOLON, O. Marvin Braun, 1310 Commonwealth Rd., Cleveland 24, O., archt.

▲ **John Traff Co.**, 3735 N. Clark St., Chicago, Ill. CA **$4,000,000.** HOSPITAL ADDN., Nelson and Wellington Sts., CHICAGO, ILL. Illinois Masonic Hospital, 834 W. Wellington Ave., Chicago, Ill. Schmidt, Garden & Erikson, 104 S. Michigan Ave., Chicago, Ill., archts. CD 4/11, under LB.

Schless Constr. Co., 703 Rogers St., Downers Grove, Ill., CA **$741,891.** 1 story, brick GRADE SCHOOL, 75 and Cass Sts., CLARENDON HILLS, ILL. Lace Marion Hills School Dist. 61, Clarendon Hills, Ill. CD 4/29, under LB.

▲ **Tunnicliff-MacDonald Eng & Constr. Co.**, P. O. Box 117, Davenport, Iowa, LB **$539,000** (8 bidders) general contract POWER PLANT, East Moline State Hospital, EAST MOLINE, ILL. State Div. Architecture & Eng., Armory-Office Bldg., Springfield, Ill. Bids May 7, CD 4/10;
M. J. Holleran, Inc., 8526 S. Chicago Ave., Chicago, Ill., LB **$747,000** (7 bidders) power piping and equip. for power plant (East Moline, Ill.);
Mohawk Electric Constr. Co., 5520 W. Montrose St., Chicago 4, Ill., LB **$164,000** (2 bidders) electric wiring for power plant (East Moline, Ill.).

▲ **Towne Realty Co.**, 5225 W. Burleigh St., Milwaukee, Wis., Owner Builds, **$1,020,000.** 74 RESIDENCES, CUDAHY, WIS.

WEST OF MISSISSIPPI

BUILDINGS—BA

▲ **Minn., Duluth** — SCHOOL — BA 5/29 — Bd. Educ., H. G. Forsburg, clk., Woodland Junior High School at Woodland Ave. and Eighth St. $1,400,000. Extended date. A. R. Melander, 603 Alworth Bldg., archt. CD 1/7.

▲ **Tex., Houston**—RESEARCH CENTER—Bids Asked—Humble Oil & Refining Co., 1216 Main St., research center expansion, 3120 Buffalo Speedway. $1,250,000. Mackie & Kamrath, 2713 Ferndale St., archts. CD 3/25.

▲ **Tex., Port Arthur**—ALKYLATION UNIT—Bids Asked—Atlantic Refining Co., General Office, Atreco, Port Arthur (selected list of bidders) 2,100 bbl. alkylation unit, adjacent to existing refinery. $1,500,000. CD 4/8.

BUILDINGS—SLC

▲ **Mo., Kansas City**—PUBLISHING HOUSE—Nazarene Publishing House, 21 E. 57 St., soon lets contract rein.-con., Nazarene Publishing House, Southeast 63 and Paseo Sts. $1,600,000. Kenneth Von Achen & Assoc., 1200 W. 39 St., Kansas City, Mo., engrs. CD 6/21

HEAVY CONSTRUCTION—LB & CA

P. Lametti Constr. Co., 615 Drake St., St. Paul, Minn., CA **$621,630**, Sanitary Sewer Imprvt. No. 1, FALCON HEIGHTS (P. O. St. Paul), MINN. Village, C. J. Stewart, clk., Falcon Heights (P. O. St. Paul), Minn. Bids Apr. 30. CD 5/7, under LB.

† **E. B. Bush Constr. Co.**, 3500 West Reno St., Oklahoma City 7, Okla., LB **$757,244**, nitroguanidine facilities, ENG-34-066-57-50, PRYOR, OKLA. U. S. Eng., Box 61, Tulsa 2, Okla. Bids May 1.

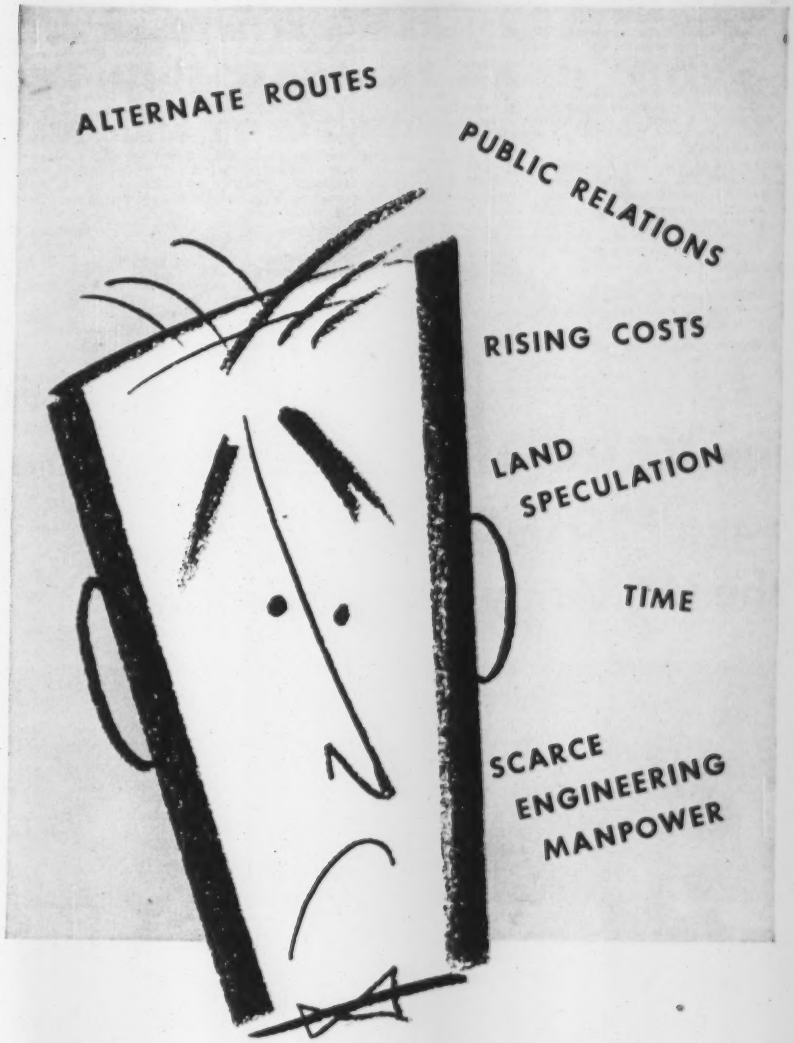
COLORADO—State Hy. Dpt., 4201 E. Arkansas St. Denver,
Pioneer Constr. Co., Route 2, Box 21, Pueblo, Colo., CA **$816,080**, est. $700,000. grading, structures 0.27 mi. Proj. I 002-3 (22) Pueblo Co. Bids May 7. CD 5/2.

▲† **Harrison Eng. & Constr. Co.**, 3706 Broadway, Kansas City, Mo., CA **$2,842,653**. airfield pavements, lengthening the North-South Runway and East-West Runway, DENVER, COLO. Ninth Naval Dist. Bldg. 1A, Great Lakes, Ill. Bids Apr. 26. CD 4/5.

BUILDINGS—LB & CA

A. **Hedenberg & Co.**, 4623 E. Superior St., Duluth, Minn., CA Est. **$800,000**, general contract ADMINISTRATION BLDG. and GATEHOUSE, HOYT LAKES, MINN. Erie Mining Co., 700 Sellwood Bldg. Duluth, Minn. Bids Apr. 25. CD 4/10, under Minn., Aurora.

▲ **Sheehy Constr. Co.**, 1255 Larpenteur Ave. West, St. Paul, Minn. LB **$1,029,400** (10 bidders), men's RESIDENCE HALL, on Minneapolis campus, MINNEAPOLIS, MINN. Regents of University of Minnesota, 404 Administration Bldg., Minneapolis, Minn. Bids May 8. CD 4/12.



Oh! what fun it is to plan a highway!

Many problems can be eliminated when you call in Aero Service to map proposed highway routes from the air. AERO has the experienced engineers, the aircraft and the modern plotting instruments to handle the entire mapping job—speedily, secretly, and at less cost. Your own busy engineering staff remains free for other important duties. And AERO topographic maps, accurate and detailed, provide precise guides for planning and development work. Get the facts now!

AERO SERVICE CORPORATION
PHILADELPHIA 20, PA. *Oldest Flying Corporation in the World*

AIRBORNE MAGNETOMETER SURVEYS • TOPOGRAPHIC MAPS
PLANIMETRIC MAPS • PRECISE AERIAL MOSAICS • RELIEF MODELS

Frantz Constr. Co., Iowa City, Iowa, CA $698,000, general contract Regina HIGH SCHOOL, IOWA CITY, IOWA. Catholic Parishes of St. Patrick's, St. Wenceslaus, St. Thomas More and St. Mary's, 104 E. Jefferson St., Iowa City, Iowa. Bids Feb. 20. CD 3/7, under LB.

▲ **Mayer-Raischer-Mayer Constr. Co.**, 119 N. 7th St., St. Louis 1, Mo., Owner Builds. $1,500,000. 120 RESIDENCE addn., in fourth section of Paddock Hills, subdivision on St. Catherine St., vicinity of Route 140, FLORISSANT, MO.

Dickie Constr. Co., 317 N. 11th St., St. Louis 3, Mo., LB $740,700 (15 bidders), general contract 530,000 sq. ft. hospital wing, 2 story connecting chapel, alteration, repairs to existing boiler house and laundry, boiler room equip., U. S. Public Health Service Proj. No-58f, ST. LOUIS, MO. Alexian Bros. Hospital, 3933 S. Broadway, St. Louis 18, Mo. Bids May 1. CD 4/3.

Hawthorne Constr. Co., Richard A. Vorhof, pres., 7567 St. Charles Rock Rd., 14, Mo. Owner Builds. Est. $600,000, 35 RESIDENCES in Black Oaks Subdivision on West Florissant Rd., South of Lindbergh Blvd., ST. LOUIS COUNTY, MO.

▲ **Schuermann Bldg. & Realty Co.**, 5934 Natural Bridge Rd., St. Louis 14, Mo. Owner Builds, Est. $1,000,000, 100 RESIDENCES addn., in Northland Hills Addn., West Florissant Rd. and Highmont Dr., ST. LOUIS COUNTY, MO.

▲ **Peter Kiewit Sons Co.**, Omaha Natl. Bank Bldg., Omaha, Neb., CA $1,000,000. 5 story 43,000 sq. ft. HOME OFFICE addn., OMAHA, NEB. Union Pacific R.R. Co., 1416 Dodge St., Omaha, Neb. L. A. Daly Co., Insurance Bldg., Omaha, Neb., archt.

▲† **Harrison & Haag**, 2117 N. W. Britton St., Oklahoma City, Okla., LB $6,797,848, (6 bidders) 433 two story HOUSING UNITS (Capehart) ENG-23-028-57-72, FORT RILEY, KAN. U. S. Eng., 1800 Federal Office Bldg., Kansas City, Mo. Bids May 7. CD 4/29.

▲ **Chemical Plants Div., Blaw-Knox Co.**, Farmers Bank Bldg., Pittsburgh, Pa., CA Est. $3,000,000-$4,000,000. CHEMICAL PLANT, 11 buildings and 4 chemical processing areas, LAWRENCE, KAN. Callery Chemical Co., Callery, Pa.

Harmon Constr. Co., 100 S. Indiana St., Oklahoma City, 4, Okla., CA $950,713, HIGH SCHOOL, BETHANY, OKLA. Putnam City School Dist. No. 1, 5900 N. W. 39 St., Bethany, Okla. Hudgins, Thompson & Ball, 1411 Clarsen St., Oklahoma City, archts. Bids May 7, awarded May 8.

Wm. Cameron & Co., 800 W. Monroe St., Harlingen, Tex., Purchase and Hire. $100,000. WAREHOUSE UNIT, HARLINGEN, TEX. Spicer-Bush-Witt, 2125 Austin Ave., Waco, Tex., archts. and engrs.

C. B. Lauch Constr. Co., 20 3rd St. N., Great Falls, Mont., CA $992,722. general work constr. RECEIVING and INTENSIVE TREATMENT BLDG. at State Mental Hospital WARM SPRINGS, MONT. Montana Bd. Examiners, Helena, Mont. Bids Apr. 25. CD 4/30, under LB.

▲ **H. W. Houston**, Pueblo, Colo., LB $1,570,000. general contract 1 story, 164,000 sq. ft. Northeast HIGH SCHOOL, PUEBLO, COLO. Bd. Educ., School Dist. No. 60, Pueblo, Colo. Bids May 1. CD 4/10.

HOW **XEROGRAPHY** and offset duplicating save $500,000 a year for the U.S. Army Signal Corps...

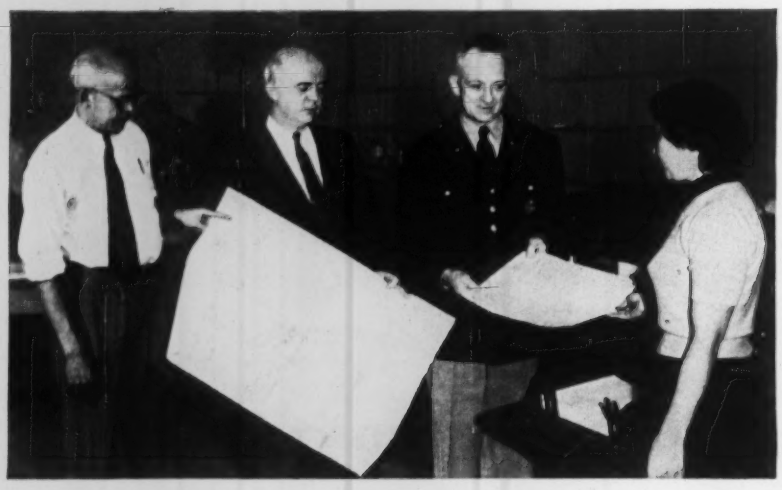


Photo shows typical 24"x36" drawing. Subject is reduced onto offset paper master (right) by xerography to 11"x17" size for runoff of multiple copies on offset duplicator.

The Army Signal Supply Agency, Philadelphia, Pa., is saving more than $500,000 annually by the use of xerography and offset duplicating in reproducing engineering drawings for invitations for bids.

For the Army Signal Corps' dramatic mortar locator, the MPQ-10, for example, 65 suppliers were solicited, each receiving 1,973 drawings or a total of 128,245. The reproduction method formerly used would have required 250 manhours at a cost of $6,040. Using xerography and offset duplicating, job time was reduced to 107 hours and cost only $2,180.

Let us show you with facts and figures how xerography is cutting duplicating costs in business, industry, and government for all types of paperwork duplicating.

WRITE for proof-of-performance folders showing how xerography is saving time and thousands of dollars for companies of all kinds, large and small.

THE HALOID COMPANY
57-80X Haloid St., Rochester 3, N. Y.
Branch offices in principal U.S. cities and Toronto

HALOID XEROX®

FAR WEST

HEAVY CONSTRUCTION—BA

▲† **Calif., San Diego**—SITE PREPARATION—BA 6/6—Eleventh Naval Dist., 1220 Pacific Hy., site preparation for runway and existing pavement repair, Naval Air Facility, San Clemente Island, Spec. 5499-56. $2,000,000. CD 8/27.

BUILDINGS—BA

▲ **Wash., Spokane**—PLANT—BA 6/6—Inland Empire Dairy Assn., E 320 Grant Ave., 4 story, bsmnt., steel, dairy processing plant. $1,250,000. Plans deposit $75 for general. Funk, Murray & Johnson, W. 524 Ave., archts. CD 4/9.

▲† **Ariz., Fort Huachuca**—BARRACKS—BA 6/11—U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., constr. enlisted men's barracks, Army Electronic Proving Ground, ENG-04-353-57-92. $1,500,000. Extended date. CD 4/19.

HEAVY CONSTRUCTION—LB & CA

▲† **Alexander Constr., Inc.**, 4641 Hiawatha Ave., Minneapolis, Minn., LB $1,517,413, est. $1,911,956. bit. surf., and guard rail for access hy., Glen Canyon Dam, Colorado River Storage Proj. in Navajo Indian Reservation, in Coconino Co., Ariz., Spec. DC 4887, ARIZONA-UTAH. Bureau Reclamation, Dpt. Interior, Kanab, Utah. CD 4/25.

† **Martin Constr. Co. & David Rice**, 212 N. Main St., Las Vegas, Nev., CA $617,037, Base plus alt. 23-unit military family housing, ENG-57-136 INDIAN SPRINGS, NEV. U. S. Eng., 180 New Montgomery St., San Francisco, Calif. Bids Apr. 23, awarded May 3. CD 4/25, under LB.

† **R. A. Heintz Constr. Co.**, 211 N. E. Columbia Blvd., Portland 11, Ore., CA $995,457. relocating S. P. and S. Railway and constr. paved access road at Ice Harbor Lock and Dam, CIVENG-45-164-57-56, WASHINGTON. U. S. Eng., City-County Airport, Walla Walla, Wash. Bids Apr. 11. CD 4/17, under LB.

▲† **A. Teichert & Son, Inc.**, P. O. Box 397, Baldwin Park, Calif., CA $4,418,920. Los Angeles River imprvs. Owensmouth to Corbin Aves., ENG-04-353-57-30, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Mar. 19, awarded May 2. CD 3/21, under LB.

▲† **Silberger Constructors & J. B. Stringfellow**, P. O. Box 6, Riverside, Calif., CA $2,698,541. improve Del Mar Boat Basin, Spec. 5501-56; dredging entrance channel, extension of existing jetty, Oceanside, CAMP PENDLETON, CALIF. Eleventh Naval Dist., 1220 Pacific Hy., San Diego, Calif. Bids 4/30. CD 8/27, under Public Buildings.

CALIFORNIA—State Dpt. P. Wks., 1120 N. St., Sacramento.

R. E. Hazard Constr. Co. and W. F. Maxwell Co., Cabrillo Freeway at Friars Rd., San Diego, Calif., CA $947,769. constr. 3 bridges and grading, surf. approaches 8.4 mi. US 101 between 0.7 mi. south of Dairy Mart Rd. and 24th St. in National City, San Diego Co. Bids Apr. 25, awarded May 7, CD 5/2, under LB.

† **Pacific Dredging Co. and Franks Dredging Co.**, 14409 S. Paramount Blvd., Paramount, Calif., LB $972,000, est. $1,500,000 (3 bidders) (joint venture) dredge Mission Bay, Quivera Basin and Main Channel, San Diego River, ENG-04-353-57-39, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids May 1. CD 4/8.

▲† **T. M. Paige Corp. & R C R Corp.**, 1432 E. Phillips Blvd., Pomona, Calif., CA $1,317,171. Devil, East Twin, Warm, and Lytle Creeks, flood control channel imprvs., Santa Ana River Basin, ENG-04-353-57-38, San Bernardino, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Awarded Apr. 26. CD 1/20/45.

▲ **R. A. Watson Co.**, P. O. Box 697, North Hollywood, Calif., LB $1,225,135, est. $1,300,000 (5 bidders) Storm Drain Bond Issue Proj. 54, Pico Blvd. and Fairfax Ave. Storm Drain, LOS ANGELES, CALIF. Los Angeles Co. Flood Control Dist., 12250 Alcazar St., Los Angeles, Calif. Bids May 3, CD 4/2.

BUILDINGS—LB & CA

▲ **Jacks & Irvine Co.**, 620 Market St., San Francisco, Calif., LB $1,126,716 (8 bidders) (base bid) 2 story open structure for vehicles, maintenance and story rein.-con. open structure for vehicles, maintenance and storage, SERVICE BLDG., BERKELEY, CALIF. Bd. Regents, University of California, Administration Bldg., Berkeley, Calif. CD 11/27.

Harold L. Shaw, 650 S. Spring St., Los Angeles, Calif. Owner Builds. $539,731. 44-6 and 7 room 47x27 ft. stucco DWELLINGS, San Homero Way, Lots 61-104 Tr. 2329, BUENA PARK, CALIF. Rognstad & Sorenson, 2636 S. Baldwin Ave., Arcadia, Calif., archts.

Noyes Roach Co., 5017 Telegraph Rd., Los Angeles, Calif. CA $857,900 est. $1,225,210. 2 story 87,000 sq. ft. type A, concrete tilt-up, lift-slab and cast-in-place roof decks, HIGH SCHOOL, COSTA MESA, CALIF. Newport Harbor Union High School Dist., Costa Mesa, Calif. Pleger, Blurock and Haugan and George Lind, 2919 Newport Blvd., Newport Beach, Calif., archts. Bids Apr. 30. CD 4/11.

Harris Constr. Co., P. O. Box 109, Fresno, Calif., LB $533,544. (2 bidders) 1 story, rein.-con. precast con-

crete panels structural steel ENGINEERING BLDG. FRESNO, CALIF. State Div. Architecture, 1120 N. St., Sacramento, Calif. Bids May 7. CD 4/15.

Crown Constr. Co., 5059 Pico Blvd., Los Angeles, Calif. Owner Builds. **$584,500.** 1412 sq. ft., 44 DWELLINGS, Jenner, Camolin, N. 17th and 18th Sts. West, LANCASTER, CALIF.

▲ **Paul W. Speer, Inc.**, 3425 Cahuenga Blvd., Los Angeles, Calif. LB **$2,259,000.** (3 bidders) constr. OLIVE VISTA JUNIOR HIGH SCHOOL, San Fernando, LOS ANGELES, CALIF. Los Angeles Bd. Educ., 1425 S. San Pedro St., Los Angeles, Calif. Bids May 9. CD 4/23.

▲ **Beverly Development Co.**, 8549 Wilshire Blvd., Beverly Hills, Calif. CA **$1,729,000;** 1125 sq. ft., 133 DWELLINGS, N. Siesta Ave., E. Dillerdale, E. Berrydale, E. Donaldale, PUENTE, CALIF. Beverly Mutual Homes No's 9, 10, 11 and 12, Inc., 6549 Wilshire Blvd., Beverly Hills, Calif. Martin Stern 8549 Wilshire Blvd., Beverly Hills, Calif., archt.

Barrett Constr. Co., 1800 Evans Ave., San Francisco, Calif., CA **$750,000.** 1 story, bsmnt., mezzanine, Type I constr. WAR MEMORIAL GYMNASIUM, SAN FRANCISCO, CALIF. University of San Francisco, 2130 Fulton St., San Francisco, Calif. CD 12/4.

Herbert Goldsworth, P. O. Box 710, Santa Monica, Calif. LB **$652,000** est. $400,000 (8 bidders) 2 story, frame brick 18,000 sq. ft. and 20,000 sq. ft. prefab steel, concrete slab EDUCATIONAL FACILITIES BLDG. and MAINTENANCE SHOPS, TORRANCE, CALIF. Torrance Unified School Dist., 2335 Plaza Del Amo, Torrance, Calif. Ray Doniey, 8320 Melrose Ave., Los Angeles, Calif., archt. CD 4/17.

CANADA

BUILDINGS—SLC

B. C., North Surrey—HOSPITAL—Surrey Memorial Hospital, Surrey, soon lets contract 4 story, 62 bed rein.-con. hospital, curtain wall exterior finish. $500,000. Gardiner, Thornton, Gathe & Assocs., 1520 Alberni St., Vancouver, archts. CD 1/4.

Man., Fort Carry—PLANT—Visking Limited, Lindsay, Ont., soon lets contract 15,000 sq. ft. steel, concrete polyethylene plant to supply plastic sheets and tubes to converters of fabricators. $500,000. Smith, Carter, Katelnikoff, 65 Dewdney Ave., Winnipeg, archts. CD 12/20.

HEAVY CONSTRUCTION—LB & CA

▲ **Mannix-O'Sullivan Paving**, 604 Northern Hardware Bldg., Edmonton, Alta., CA **$1,104,750.** asph. surf. grav. roadways on south side, EDMONTON, ALTA. City, Civic Block, Edmonton, Alta. Bids Apr. 16, awarded May 2. CD 4/51;
Square M Constr. Ltd. and Coleman Collieries Ltd., Edmonton, Alta., CA **$229,983** grav. road constr. Contr. 125 (Edmonton, Alta.).

BRITISH COLUMBIA—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont.,

Assinboia Constr. Co. Ltd., P. O. Box 398, Calgary, Alta., LB **$705,714,** bit. stab. course 7 mi. Trans-Canada Hy. in Yoho National Park, Mile 25 to Mile 32, Field. G. B. Williams, c/o owner, ch. engr.

Farmer Constr. Ltd., 2925 Douglas St., Victoria, B. C. LB **$599,935** (6 bidders) powerhouse and appurtenant works at Ash River development near Port Alberni, hydro-electric power proj., BRITISH COLUMBIA B. C. Power Comn., P. O. Box 500, Victoria, B. C. Crippen Wright Eng. Ltd., 207 W. Hastings St., Victoria, B. C., engrs.

Nelson River Constr. Ltd., 101 Dawson Rd., Winnipeg, Man., CA **$761,266.** new runway about 5,700x200 ft and building up and reconstr. existing taxiways at Airport, BRANDON, MAN. Dpt. Transport, Hunter Bldg., Ottawa, Ont. Bids Apr. 4, awarded May 3. CD 4/15, under LB.

▲ **T. C. Gorman (Nova Scotia)** Ltd., 505 Roy Bldg., Halifax, N. S., CA **$1,146,857** (4 bidders) harbor imprvs., Burin-Burego Constituency, PORT AUX BASQUES, NEWFOUNDLAND. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. Awarded May 3. CD 10/4/55

▲ **Canadian Hoosier Eng. Co. Ltd.**, 340 Blvd. Cremazie, Montreal, Que., CA Est. **$5,000,000-$6,000,000.** second power transmission line from Bersimis development to Montreal, QUEBEC. Hydro-Quebec, 107 Craig St. W., Montreal, Que. Awarded May 3.

▲ **National Harbors** Bd. West Block, Parliament Bldgs., Ottawa, Ont., rejected bids, pile foundations for Elevator No. 4, Montreal Harbor, MONTREAL, QUE. LB **$1,500,000.** Project cancelled. CD 2/15.

BUILDINGS—LB & CA

Manson Bros. Ltd., 2230 MacPherson Ave., Burnaby, B. C., LB **$950,800** (5 bidders) Central Burnaby Composite HIGH SCHOOL, Grandview Hy., BURNABY, B. C. Burnaby School Dist., 2800 McKay Ave., Burnaby, B. C. J. L. Davis, 923 Denman St., Vancouver, B. C., archt. CD 4/26/56.

E. R. Casey Constr. Co. Ltd., 301 Yonge St., Montreal, Que., CA **$960,000.** HOUSING PROGRAM, incl. 60 duplexes. Land 78 near 11000 Gouin Blvd. E. and Omer Gaucher Blvd., Rivieres des Prairies, MONTREAL, QUE. Owner, c/o contractor. Awarded May 6.

ALASKA

HEAVY CONSTRUCTION—LB & CA

† **ALASKA**—Bureau P. Rds., Dpt. Commerce, Box 1961, Juneau,

Stock & Grove, Inc., Box 2051, Anchorage, Alaska, CA $578,659. clearing, grading, 5.232 mi. Wrangell

There's a MIL-CARB® Washer Back of Each Nut...

and for Very Good Reasons!

Today, riveting is taking a back seat in favor of high strength steel bolting . . . for economy, speed, safety, quietness, higher fatigue resistance and permanent joining of structural steel members. Here is progress *at work!*

And because you are an essential part of this progress, you are a *potential* or *present user* of MIL-CARB heat-treated washers . . . the "tremendous trifles" that can be worth their weight in gold!

It is logical to assume that no high strength bolt assembly is any better than its washers. "Washer failure" must be guarded against at all costs . . . but with MIL-CARB Washers there is no cost penalty. Nuts may be torqued up to specification maximums without danger of galling or grinding of the washer. And because these high quality washers are uniformly flat, the bolt, nut, washer and structural steel become a tight, permanent, integral whole.

All MIL-CARB washers are fabricated from Prime Heat-Treat Special Soundness Steel, to insure uniform quality control . . . always equal to rigid specifications (ASTM designation: A-325 applying to nuts, bolts and washers).

Leading consulting engineers and contractors recognize and applaud the leadership of MIL-CARB Washers in this relatively new, highly specialized field. As a guarantee of the unyielding permanence of your steel structures, specify MIL-CARB WASHERS.

• • •

Distributed by Leading Nut and Bolt Manufacturers and

U. S. STEEL SUPPLY DIVISION
UNITED STATES STEEL CORPORATION
208 South La Salle St. • Chicago 4, Illinois

Since 1887

WROUGHT WASHER MFG. CO.
2224 S. BAY ST., MILWAUKEE 7, WIS.

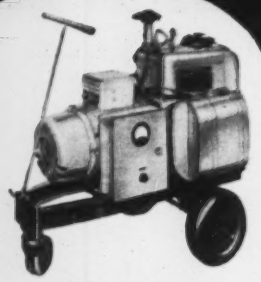
THE WORLD'S LARGEST PRODUCER OF WASHERS

Power Plants Speed Construction

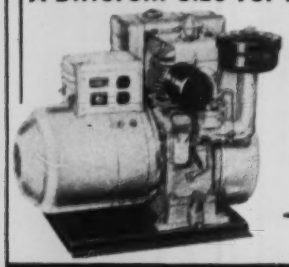
USE POWER TOOLS—FLOOD LIGHTS

WINPOWER PORTABLE ELECTRIC PLANTS

provide a dependable, low cost power source . . . speed up work performance by operating time and labor saving power tools. Wherever the job—whatever the need—you can count on a WINPOWER Electric Plant to meet your requirements.



A Different Size For Every Need



800 WATTS To 100 KW

All Standard Phases and Voltages

These rugged, heavy-duty 3-wheel dollies are used as a permanent mounting for 3, 4, and 5 KW electric plants where portability is desired by contractors, bridge builders, mine operators, road constructors, railroads, cities and municipalities.

Trailer-Mounted Floodlight Unit

MAKE NIGHT HOURS PAY with NITE-HAWK

Four 80,000 c.p. flood lights raise to 8½ ft.—aim in all directions. Control panel has duplex receptacles for extension light and power tool lines—voltage regulator—circuit breakers—fused circuits.

Tows at highway speeds on heavy-duty trailer with leaf springs—retractable caster wheel. This is the finest, most flexible unit available. 5 KW, 115 or 230 Volt.

Powered by Wisconsin 4 cylinder, air-cooled engine

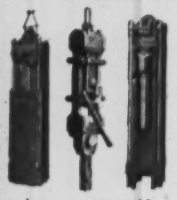
WRITE FOR LITERATURE AND PRICES

WINPOWER MFG. CO.

Dept. G-55 Newton, Iowa

McKIERNAN-TERRY

WIDE-RANGE LINE OF **PILE HAMMERS** AND **EXTRACTORS**



Now made in complete standardized line of 11 double-acting hammers, 5 single-acting hammers and 2 double-acting extractors. Also Sand Drain Equipment and Steam Generators.

Write for free descriptive Bulletins.

Also builders of coal and ore bridges and unloaders, and specially designed machinery.

McKIERNAN-TERRY CORP.

32 Mercer Street, Dover, N. J.

FOUNDATION CONSTRUCTION BY

McKINNEY

DRILLING CO.

BOX 190—LOGAN 4-8373

NACOGDOCHES, TEXAS

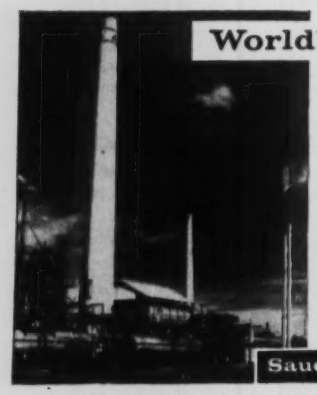
CAISSONS

DRILLED & UNDERREAMED

PIERS

WIRE OR PHONE FOR A QUOTATION ON YOUR NEXT FOUNDATION JOB ANYWHERE IN THE WORLD

OFFICES IN ATLANTA, GA. • PITTSBURGH, PA. WASHINGTON, D. C.



World's Best Acid Proof Cement

for Chimneys

SAUEREISEN No. 31

This famous time-tested cement has been used for almost a quarter of a century in chimney construction, including the world's largest and most outstanding chimney installations. Sauereisen No. 31 is specifically formulated to provide economical, efficient construction, combining long life and minimum maintenance. *We invite your inquiries*

31-A

Sauereisen Cements Co., Pittsburgh 15, Pa.

Hy. Proj. 16-A-4, C4, D3-2. Bids Apr. 16. CD 4/25, under LB.

▲† **Swalling Constr. Co. and Patti-MacDonald**, Anchorage, Alaska, and **M-B Contracting Co.**, Lloyd Bldg., Seattle 1, Wash., CA $4,386,000. petroleum handlings and storage facilities, incl. pier, underground tanks, bldgs., roads and utilities. Specs. 2419/56. ADAK, ALASKA. P. Wks. Office, 17th Naval Dist., 215 W. Harrison St., Seattle, Wash. Bids Apr. 25. CD 5/1, under LB.

BUILDINGS—LB & CA

▲ **Poole Constr. Co. Ltd.**, 10503 109 St., Edmonton, Alta., CA $5,415,350. 2 HOSTELS and SCHOOL at New Townsite, AKLAVIK, NORTHWEST TERRITORIES. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. Bids Apr. 3, awarded May 2. CD 4/10, under LB.

U. S. POSSESSIONS

HEAVY CONSTRUCTION—LB & CA

▲† **Hawaiian Dredging Constr. Ltd.**, 1350 Ala Moana, Honolulu, Hawaii, CA $12,200,000. addnl. aviation facilities, bachelor officers quarters, etc., U. S. Naval Air Station, BARBER'S POINT, T. H. P. Wks. Office, Commandant 14th Naval Dist., Navy No. 128 c/o F.P.O., San Francisco, Calif.

BUILDINGS—LB & CA

† **E. Black Ltd.**, P. O. Box 3203, Honolulu, Hawaii, CA $892,000. GUIDED MISSILE FACILITY, U. S. Naval Ammunition Depot, West Location Branch, NBy 802, OAHU, T. H. Dist. P. Wks. Office, Fourteen Naval Dist., Navy No. 128, Fleet P. O., San Francisco, Calif.

AMERICANS ABROAD

BUILDINGS—LB & CA

▲ **Lummus Co.**, 385 Madison Ave., New York, N. Y., U.S.A., CA Est. $20,000,000. design and construct ethylene oxide PLANT, PARTINGTON, ENGLAND, Petroleum Chemicals Ltd. (Royal Dutch-Shell) c/o contractor.

PROPOSED PROJECTS

WATER SUPPLY

▲ **Mich., Highland Park**—City, 30 Gerald St., water sys. expansion, incl. water mains, 2 water clarifiers, 3 m.g. reservoir and booster pumping station, etc. $1,500,000.

▲ **Mont., Great Falls**—City, City Hall, defeated $2,300,000 bonds Apr. 1, extension and imprvs. city water sys. CD 3/6.

▲ **Tex., Groesbeck and Mexia**—Cities of Groesbeck and Mexia, domestic water supply; propose dam on Navasota River, purification plant, distr. system, $1,000,000. Koch & Fowler, 3900 Lemmon St., Dallas, Tex., consult. engrs.

SEWERS, WASTE DISPOSAL

▲ **Ill., Chicago**—City, City Hall, Pratt Ave. System auxiliary outlet sewers. $1,000,000. CD 3/9/45.

▲ **Ill., Chicago**—City, City Hall, 2 incinerator buildings near Northwest and near Southwest side. $8,000,000.

▲ **Ind., Hammond**—City, City Hall, sewage treatment plant addn. and sanitary sewers, $1,200,000. Carl B. Carpenter, 7501 Indianapolis St., consult. engr.

▲ **Neb., Omaha**—City, City Hall, 18 and Farnam Sts., sewer constr. in four sections, $1,000,000. Nance-Rossie & Assoc., 1504 Dodge St., Omaha, consult. engrs. for 49th Ave. Section; Kirkham-Michael, Standard Oil Bldg., Omaha, consult. engr. for 26th Ave. Section; B. H. Backlund & Assoc., 4924 Poppleton St., consult. engrs. for Hamilton St. Section; L. A. Daly Co., Insurance Bldg., consult. engr. for Redman Ave. Section. CD 10/28/52.

▲ **N. Y., Freeport**—Village, Village Hall, sewage disposal plant expansion and modernization, $1,000,000; incinerator plant expansion and modernization, $500,000; drainage expansion, $300,000. CD 11/6/53.

BRIDGES

▲ **MISSISSIPPI AND ARKANSAS**—Mississippi State Hy. Dpt., Jackson, Miss. and Arkansas State Hy. Comm., Little Rock, Ark. (joint owners) constr. Mississippi River toll Bridge at Helena. $14,000,000. Bids about July. Howard, Needles, Tammen & Bergendoff, 1805 Grand St., Kansas City, Mo., consult. engrs. CD 5/25/55.

▲ **Ont., Toronto**—City, City Hall, 1,700 ft. bridge on Eastern Ave. across Don River and two sets railway tracks. $3,000,000.

STREETS AND ROADS

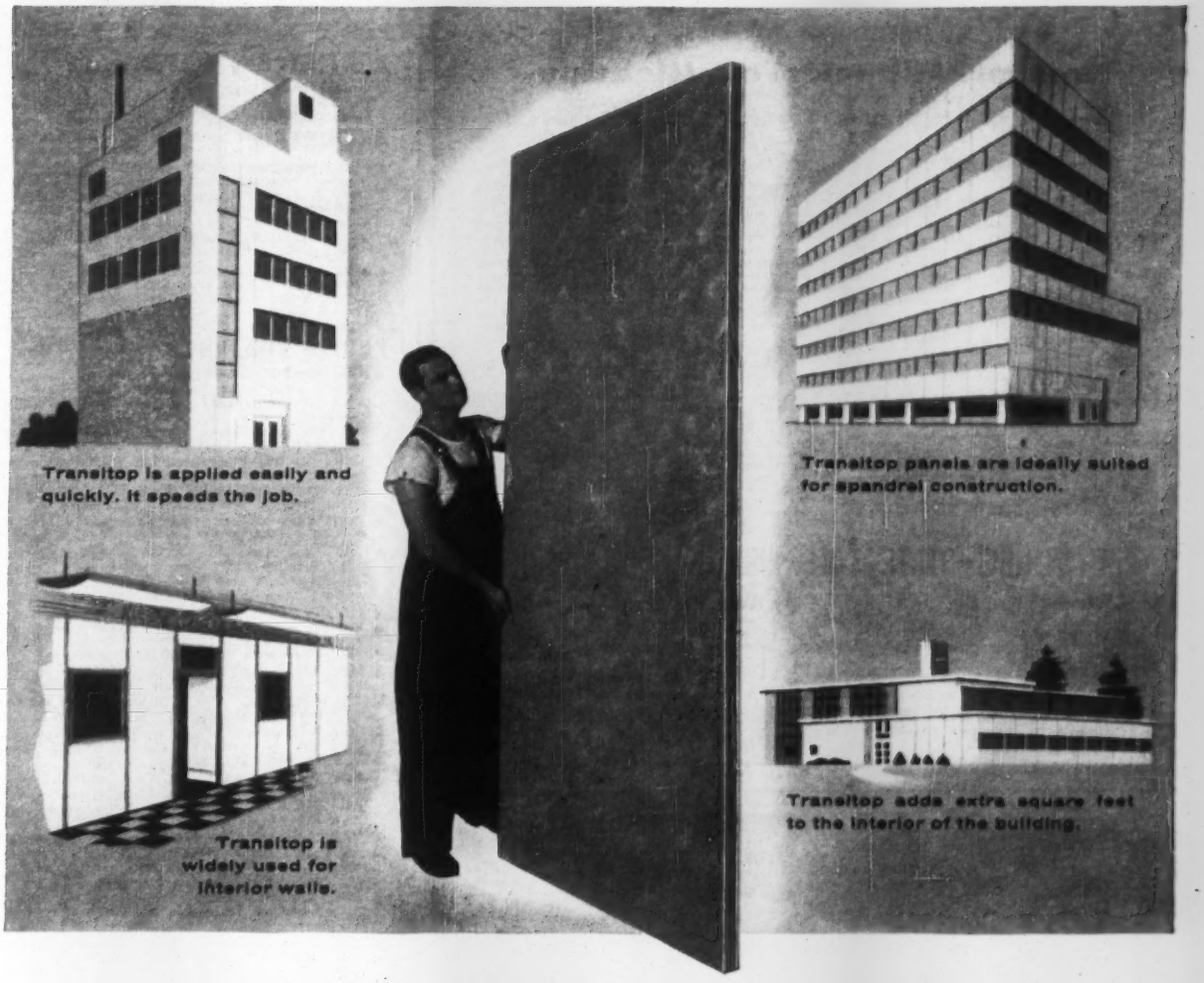
▲ **NEW YORK**—Bureau Conaracts & Accounts, The Governor Alfred E. Smith State Office Bldg., Albany.

Albany Co.—approx. 8.5 mi. limited access expressway from vicinity of Washington Ave. Thruway Interchange No. 24 in City of Albany, to Mohawk River where new bridge is to be constructed, incl. 2 concrete roadways each 36 ft. wide, separated by median with minimum width of 36 ft. FAI Proj., Sections 1 and 2, part of Northway Project. $9,000,000.

Chenango Co.—reconstr. approx. 7⅛ mi. Touring Route 12 from southerly village line of Greene, northerly through Greene to point ¼ mi. northeast of Green-Oxford Town line, as 2-lane hy. partly on new location, FAI Proj. $1,250,000.

Saratoga Co.—approx. 35.5 mi. limited access expressway from proposed bridge over Mohwak River to pro-

(Continued on page 102)


Transitop is applied easily and quickly. It speeds the job.
Transitop panels are ideally suited for spandrel construction.
Transitop is widely used for interior walls.
Transitop adds extra square feet to the interior of the building.

8 to 12 feet tall—easy to install

Johns-Manville TRANSITOP® prefabricated panels meet the trend to curtain wall construction in modern buildings

WHEN used as curtain walls, J-M Transitop insulated structural panels often pay their own costs for economy, speed of installation and permanence, in buildings of heavy or light construction.

For instance, a Transitop 1 9/16-inch-thick curtain wall has the equivalent insulation value of a 24-inch thick brick or masonry wall. Because these Transitop panels weigh only 4.7 lbs. per square foot, they reduce the dead load factor. They permit lighter wood or steel framing and make for less expensive foundations.

Comparative cost figures will show clearly that Transitop structural panels can cut dollars from total building costs. You'll note big savings in steel, lumber, labor and time.

Attractive in appearance yet amazingly durable, Transitop panels cannot rust or corrode. They require no painting or other preservative treatment.

J-M Transitop is a prefabricated panel of integrally impregnated insulating board, faced on both sides with noncombustible Asbestos Flexboard sheets. Available in panels 4′ wide by 8′, 9′, 10′ or 12′ long; and 11/16″, 1 1/8″, 1-9/16″ or 2″ thick.

For complete information send for a copy of "J-M Asbestos Transitop." Write: Johns-Manville, Box 111, New York 16, New York. In Canada, write: 565 Lakeshore Road East, Port Credit, Ontario.

THE AMERICAN INSTITUTE OF ARCHITECTS 1857-1957

Johns-Manville congratulates the American Institute of Architects on its 100th Anniversary.

—Consult an architect—use quality materials.

JOHNS MANVILLE JM PRODUCTS

Johns-Manville

ADVERTISEMENT FOR BIDS

Northern Illinois Toll Highway

Bids to be opened June 13, 1957

CONTRACT T-3A

The work to be done under this Contract shall be commenced on July 15, 1957, or on such earlier date as may be mutually agreed upon between the Commission and the Contractor. All work under this Contract shall be completed on or before December 15, 1958, and consists of: The grading, drainage, paving, the construction of appurtenances, and the erection of precast concrete and structural steel bridges for approximately 3.73 miles of the Tri-State Tollway of the Northern Illinois Toll Highway in construction section T-3A thereof in Cook County, Illinois.

The approximate quantities of the principal items of work are:

Roadway Excavation, Unclassified	260,000 C.Y.
Special Excavation	60,000 C.Y.
Borrow	1,250,000 C.Y.
Special Fill	50,000 C.Y.
Selected Subgrade	74,000 C.Y.
Granular Subbase	47,000 C.Y.
10" Reinforced P.C.C. Pavement	132,000 S.Y.
3" Bituminous Concrete Shoulders	83,000 S.Y.
Structure Concrete	11,900 C.Y.
Reinforcing Steel	1,705,000 Lbs.
Structural Steel (Erection)	3,610,000 Lbs.

CONTRACT T-6A

The work to be done under this Contract shall commence on or before July 15, 1957, or on such earlier date as may be mutually agreed upon between the Commission and the Contractor. All work under this Contract shall be completed on or before July 31, 1958, and consists of: The grading, drainage, paving, the construction of appurtenances, and the erection of precast concrete and structural steel bridges for approximately 2.98 miles of the East-West Tollway of the Northern Illinois Toll Highway in construction section T-6A thereof in DuPage County, Illinois.

The approximate quantities of the principal items of work are:

Roadway Excavation, Unclassified	1,000,000 C.Y.
Special Excavation	50,000 C.Y.
Borrow	500,000 C.Y.
Special Fill	10,000 C.Y.
Selected Subgrade	150,000 C.Y.
Granular Subbase	80,000 C.Y.
10" Reinforced PCC Pavement	112,000 S.Y.
3" Bituminous Concrete Shoulders	67,000 S.Y.
Structure Concrete	15,500 C.Y.
Reinforcing Steel	2,000,000 Lbs.
Structure Steel (Erection)	2,681,000 Lbs.

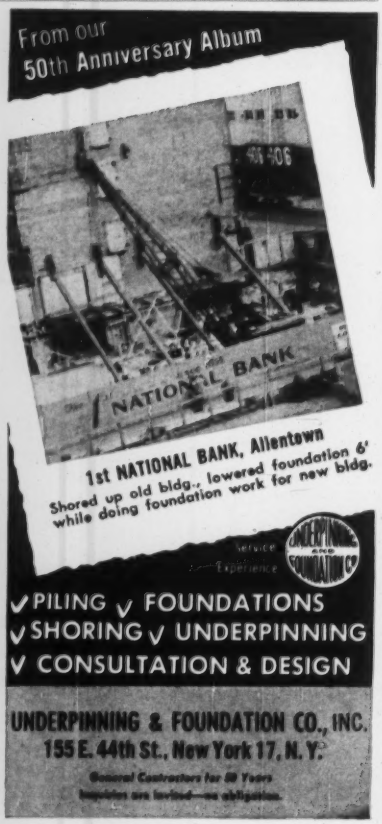
THE ILLINOIS STATE TOLL HIGHWAY COMMISSION

20 N. Wacker Dr., Chicago — **By Austin L. Wyman, Chairman**

Write, wire or phone for detailed information and necessary forms, Chief Engineer, Room 1654, 20 N. Wacker Dr. Chicago 6, Ill. Telephone FRanklin 2-7020.

Previously advertised bids for Contracts E-1A, T-5A, T-5B and T-5AB will be opened June 6, 1957.

Rx for Wet Job "Headaches"
Consult with Griffin's engineers
Ground water analysis and pre bid estimate —no obligation
GRIFFIN
WELLPOINT CORP.


From our 50th Anniversary Album
1st NATIONAL BANK, Allentown
Shored up old bldg., lowered foundation 6' while doing foundation work for new bldg.
✓PILING ✓FOUNDATIONS
✓SHORING ✓UNDERPINNING
✓CONSULTATION & DESIGN
UNDERPINNING & FOUNDATION CO., INC.
155 E. 44th St., New York 17, N.Y.

(Continued from page 100)

posed bridge over Hudson River, F.A.I. Proj., Sections 2, 3, 4, 5 and 6, part of Northway Project. $35,000,000.

EARTHWORK, WATERWAYS

▲ **Tex., Tyler**—City, City Hall, lake-dam, $1,522,000. Wisenbaker, Fix & Assocs., Tyler, Tex., consult. engrs. CD 5/22/53.

AIRPORTS

▲ **Man., Winnipeg**—AIRPORT TERMINAL, etc.—Dpt. Transport, Hunter Bldg., Ottawa, Ont., plans by Green, Blankstein, Russell & Assocs., 222 Osborne St. N., airport terminal bldg. at Winnipeg Airport, $5,000,000; exten. one runway to 8,700 ft. and taxistrip $2,000,000; power house equipment garage, radio and radar facilities, $500,000.

▲ **Ont., Ottawa**—WIND TUNNEL—Defence Constr. (1951) Ltd., 56 Lyon St., supersonic wind tunnel in Uplands Airport vicinity. $1,500,000. Bids this summer. Dillworth-Ewbank, 4210 Dundas St. West., Toronto, consult. engrs.

PUBLIC BUILDINGS

▲ **Ark., Pine Bluff**—HOSPITAL—Jefferson Co., Hon. Joe Henslee, judge, voted $2,250,000 bonds Apr. 23, constr. 234-bed county hospital bldg. $4,500,000. Reed & Willis, First Natl. Bank Bldg., archts. Wittenberg, Delony & Davidson, Pyramid Life Bldg., Little Rock, assocs. archts. CD 4/2.

▲ **Calif., Stockton**—HOSPITAL—San Joaquin Co., c/o County Clerk, Courthouse, plans by Warren C. T. Wong, 2644 Pacific Ave., bldgs. at San Joaquin County General Hospital, French Camp. $1,800,000.

▲ **Conn., Derby**—SCHOOL—Town of Derby, Town Hall, high school. $2,000,000.

▲ **Conn., New Haven**—HOUSING—New Haven Housing Auth., 195 Church St., plans by Pedersen & Tilney, 111 Whitney St., 26 buildings incl. 154-units of moderate rental housing, Eastern St. $2,420,000. CD 10/6/55.

▲ **Conn., Trumbull**—SCHOOL—Town, Town Hall, plans by Lyons & Mather, 211 State St., Bridgeport, high school, Middlebrook Rd. $1,500,000. CD 5/9/56.

▲ **Ind., Bloomington**—SCHOOL—Bloomington Metr. School Dist., Lloyd Anderson, pres., 441 S. College St., Junior High School, between 14 and 17 Sts., Monroe and Maple Sts. $1,200,000.

▲ **Ind., Indianapolis**—SCHOOL—Warren Twp. Metr. School Dist., W. Spenser Askren, pres., 8400 E. 10th St., high school. $2,000,000.

▲ **Kan., Wichita**—SCHOOL—Bd. Educ., 428 S. Broadway, plans by Forsbloom & Parks, Beason Bldg., South High School. $3,554,000. Bids about June 1. CD 8/27.

▲ **Md., Cumberland**—SCHOOL—Allegany Co. Bd. Educ., Cumberland, plans by Johannes & Murray, 855 Pershing Dr., Silver Springs, high school addn., Cumberland. $1,000,000.

▲ **Md., Denton**—SCHOOL—Caroline Co. Bd. Educ., Denton, plans by Johannes & Murray, 855 Pershing Dr., Silver Spring, high school, near here. $1,300,000.

▲ **Md., Marlboro**—SCHOOL—Prince George's Co. Bd. Educ., Marlboro, plans by Harder & Dressel, Gov. Ritchie High Way, Glen Burnie, high school, Oxon Hill. $1,800,000.

▲ **Md., Rockville**—SCHOOL—Montgomery Co. Bd. Educ., Rockville, plans by Frank Duane, 1726 Main St. N. W. Wash., D. C., Junior High School, Gaithersburg. $1,250,000. CD 2/2/53.

▲ **Mass., Amherst**—APARTMENTS—University of Mass., Alden C. Brett, pres. Bldg. Comn., plans by Louis W. Ross, 131 State St., Boston, 9 bldgs., 100 units, married student apartments. $1,000,000. CD 10/25.

▲ **Mass., Charlemont**—SCHOOL—Charlemont Regional School Dist. plans by Warren H. Ashley, 967 Farmington Ave., West Hartford, Conn., Mohawk Trail Regional Junior-Senior High School. $1,250,000.

▲ **Mich., Detroit**—SCHOOL—City, Bd. Educ., 1354 Broadway, plans by Wakely-Kushner, 21429 Mack St., Greater Gratiot Elementary School. $1,500,000. CD 7/16.

▲ **Mich., Mt. Clemens**—HEALTH CENTER—Bd. Supervs. Macomb Co., County Bldg., plans by Wakely-Kushner, 21429 Mack St., Detroit, county health center. $1,000,000. CD 8/5/54.

▲ **Mich., St. Clair Shores**—SCHOOL—City, Lakeview School Dist., 21100 E. 11 Mile Rd., voted bonds Apr. 29, Junior High School, Senior High School addn., and 28 elementary school rooms. $3,000,000. CD 4/1.

▲ **Mont., Great Falls**—HOSPITAL—Cascade Co., Court House, plans by Kenneth Knight, Medical Arts Bldg., county convalescent hospital, $1,900,000. CD 11/12.

▲ **N. M., Grants**—SCHOOL—Grants School Dist., Grants, voted bonds Apr. 23, school, $1,000,000.

▲ **N. Y., Brooklyn**—SCHOOL—Bureau Constr. Bd. Educ., 45-12 Crescent St., Long Island City, plans by Tito Di Vincenzo, 135 E. 65 St., New York, Zone 21, Proj. E-613, P.S. 142 addn., and modernization at Henry St. and 3 Place, $1,800,000. CD 8/2.

▲ **N. Y., Brooklyn**—HOUSING—New York City Housing Auth., 299 Broadway, New York, Zone 7, plans by Adolph Goldberg & Herbert Epstein, 164 Montague St., Zone 2, Louis Heaton Pink Houses, incl. 22 buildings, for 1,500 families on 31-acre tract at Linden Blvd., Crescent St., Stanley Ave., Elderts Lane, NY-5-35, $21,524,000. Work to go ahead in summer. CD 6/22/55.

▲ **N. Y., Edgemere**—HOUSING—New York City Housing Auth., 299 Broadway, New York, Zone 7, plans by

Bloch & Hesse, 18 E. 41 St., New York, Zone 17, 24 buildings for 1415 families, Edgemere Houses, on site bounded by B. 59 St., Almeda Ave., B 51 St. and Bloch Channel Dr., Proj. NYS-79, $15,662,650. CD 2/28/55.

▲ **N. Y., New York**—PARKING GARAGE—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, Proj. TF-4, parking garage in 8 Ave. between 53 and 54 Sts. $1,800,000. Seelye, Stevenson, Value & Knecht, 101 Park Ave., New York, Zone 17, engrs. CD 10/14/55.

▲ **N. Y., St. George**—HOSPITAL—Archdiocesan Bldg. Comn., 451 Madison Ave., New York, Zone 22, plans by York & Sawyer, 101 Park Ave., New York, Zone 17, St. Vincent hospital addn., Bard Ave. $1,400,000.

▲ **O., St. Bernard**—POWER PLANT—City, City Bldg., defeated $1,500,000 bonds Apr. 30, renovating electric power plant. CD 3/14.

▲ **Pa., Pottstown**—SCHOOL—Pottstown School Dist., Pottstown, plans by Sanders & Thomas Assoc., Pottstown, Senior High School, $1,000,000. CD 2/25.

▲ **R. I., Kingston**—ARTS, SCIENCES—State R. I. & Prov. Plants, Div. Purchase, State House, Providence, plans by Charles A. Maguire & Assoc., Turks Head Bldg., Providence, College of Arts and Sciences Business Administration Bldg., University of Rhode Island, $1,100,000. CD 11/9.

▲ **W. Va., Charleston**—NURSES RESIDENCE, etc.—St. Francis Hospital, Sister De Chantel, 333 Laidley, plans by Vecellio & Kreps, 215 Odd Fellows Bldg., nurses residence and training school, $1,421,200. Bids probably in July.

COMMERCIAL BUILDINGS

▲ **Ala., Midfield**—SHOPPING CENTER—Midfield Park, Inc., 1717-2nd Ave. S., Birmingham, plans by Sidney H. Morris & Assocs., archts. and consult. engrs., 134 N. LaSalle St., Chicago, Ill., 26-store, 107,250 sq. ft., 14-acre site shopping center, Grasselli and Woodward Rds. $2,500,000.

▲ **Ill., Aurora**—HOTEL, etc.—Schwanz & Cox, agt., 104 Fox St., hotel, shopping center and race track, Aurora Downs Race Track, $17,000,000.

▲ **Ill., Chicago**—OFFICE—Kiwanis International, 520 N. Michigan Ave., plans by Mielke & Smith, 53 W. Jackson Blvd., Kiwanis International Headquarters bldg., Erie and Rush Sts. $1,000,000. CD 6/21.

▲ **Ill., Glenview**—HOSPITAL, etc.—St. Joseph Hospital, 2100 N. Burlington St., Chicago, plans by Burnham & Hammond, 53 W. Jackson Blvd., Chicago, 7 story brick hospital and parking area, Waukegan Rd., south of Glenview Rd. $3,000,000.

▲ **Ky., Louisville**—SHOPPING CENTER—McMahon Co., (R. F. McMahon), c/o Norman Sweet, archt., 811 Republic Bldg., 1 story, 160,000 sq. ft. Town Talk Shopping Center, Taylorsville Rd. $1,000,000.

▲ **Mich., Southfield**—ACCOUNTING—Michigan Bell Telephone Co., 1365 Cass St., Detroit, Zone 26, plans by Smith, Hinchman & Grylls, Inc., 800 Marquette Bldg., Detroit, 2 story, 100,000 sq. ft. accounting building, on 40 acre tract at James Couzens and Southfield Rds., north of Nine Mile Rd., Southfield Twp. $2,250,000. CD 6/5.

▲ **Mont., Billings**—HOSPITAL—Billings Deaconess Hospital, 2813 9th Ave. N., 4 story, bsmnt. hospital addn. $1,000,000.

▲ **N. J., Paterson**—HOSPITAL—Barnert Memorial Hospital, 680 Broadway, 100-bed hospital addn. 31 St. side, $2,000,000.

▲ **N. Y., Canton**—DORMITORY, etc.—St. Lawrence University, Canton, plans by Moore & Hutchins, 215 E. 37 St., New York, N. Y., dormitory and dining hall. $1,200,000. CD 4/26.

▲ **N. Y., Harrison**—HOSPITAL—Archdiocesan Bldg., Comm., 451 Madison Ave., New York, Zone 22, plans by Eggers & Higgins, 100 E. 42 St., New York, Zone 17, St. Vincent's Retreat, hospital addn. $1,600,000.

▲ **N. Y., Jamaica**—DWELLING, etc.—Brikay Constr. Corp., 16 Court St., Brooklyn, plans by Seelig & Finkelstein, 153 Pierrepont St., Brooklyn, 98x316 ft. multiple dwelling and garage, 8410 Main St., southwest corner 82 Dr. $1,017,000.

▲ **N. Y., Lake Success**—SHOPPING CENTER—Lake Success Shopping Center, Inc., c/o John Graham & Co., 444 Fifth Ave., New York 18, N. Y., shopping center addn. to be called Lake Success Center Annex. $3,000,000.

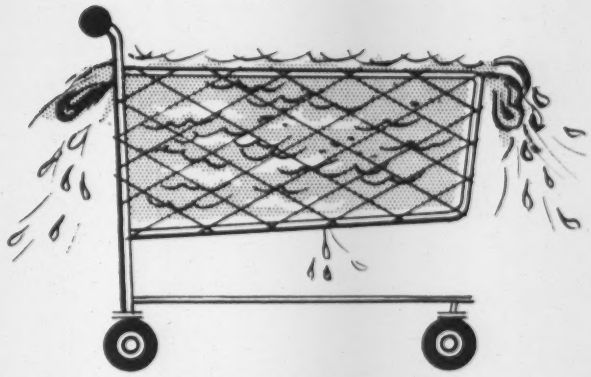
▲ **N. Y., New York**—ANNEX—New York Daily News, 220 E. 42 St., plans by Harrison & Abramovitz, 630 Fifth Ave., Zone 20, 19 story annex to existing bldg., S.W. corner 42 St. and Second Ave., $11,500,000.

▲ **N. Y., Yonkers**—HIGH SCHOOL—Archdiocesan Bldg. Comm., 451 Madison Ave., New York, Zone 22, plans by Starrett & Van Vleck, 267 5th Ave., New York, Zone 16, St. Barnabas Girls High School. $1,500,000.

▲ **N. C., Charlotte**—HOSPITAL—Charlotte Memorial Hospital, 1400 Scott Ave., Memorial Hospital addns. $4,000,000. CD 11/29/51.

▲ **O., Cincinnati**—SHOPPING CENTER—Martin L. Holman Co., 2434 Langdon Farm Rd., plans by Lee Firth, 3040 Madison Rd., shopping center on 1½ acres, four 4-family apartment bldgs. Yosemite and Langdon Farm, $2,500,000. Russell Glazier, 3334 Woodford St., consult. engr.

▲ **O., Cincinnati**—RECREATION—Herman Mergard, Jr., 1322 E. McMillan St., plans by Wilkens, Schrand & Wilkens, Union Terminal Bldg., recreation bldg. incl. 28 bowling lanes, cocktail lounge, restaurant, etc. 9 and Walnut Sts. $2,000,000. Willard Pistler, 4 W. 7 St., consult. engr. CD 5/25/53.



buying lots of water? . . .

. . . Then the pump YOU want is a

REDA

Submergible

PUMP

Reda gives you economical, dependable water service for ALL industrial water needs.

Reda offers a complete line for wells as small as 4"; lifts from 30 to over 10,000 feet; capacities of 5 to over 1000 G.P.M.

Reda Pumps are tried and proven! Over 100,000 are installed for homes, farms, industries, municipalities, etc.

Choose Reda for dependable, modern water service.

Write for Industrial Pump Bulletin R-432. Complete information will be promptly furnished.

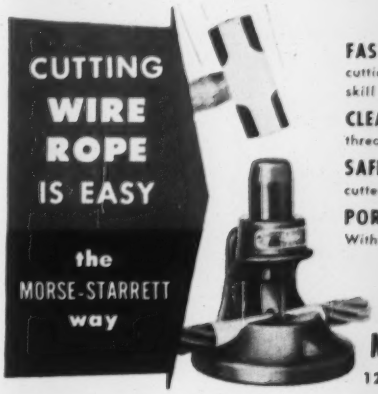
SUBMERCIBLE REDA PUMPS

SIGN OF QUALITY

REDA PUMP COMPANY

BARTLESVILLE, OKLAHOMA

World's largest manufacturer of Submergible motors and pumps for over 35 years



FAST Especially designed cutting blade and dies assures fast cutting action. The hammer principle eliminates any special skill requirements.

CLEAN Wire rope ends are cut smooth and clean for perfect threading or splicing.

SAFE The enclosed cutting blade locked in the body of the cutter assures perfect safety.

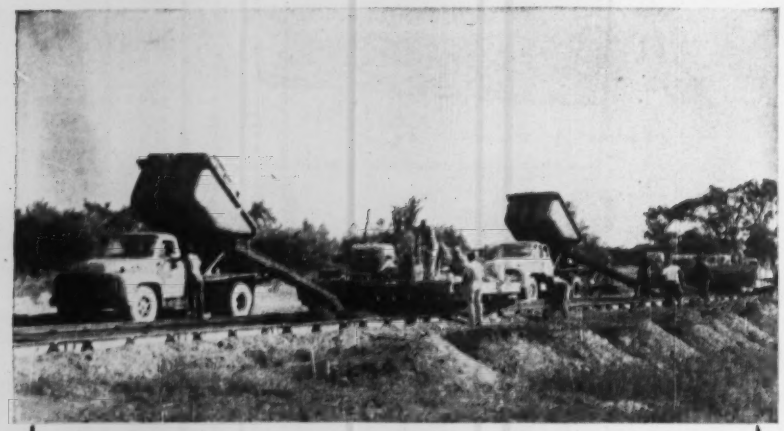
PORTABLE Models for tool kit or stationary operation. With cutting capacities up to: 1 inch, 1-1/16 inch, 1-1/2 inch.

SEE YOUR DEALER OR WRITE DEPT. "B"

MORSE-STARRETT PRODUCTS CO.

1204 - 49th AVENUE, OAKLAND 1, CALIFORNIA

Dumpcretes *on the New York Thruway*



The D. W. Winkelman Company used Dumpcretes for the *fourth* time to haul and place 132,000 cu. yds. of concrete for both paving and structures—on contracts of $9,900,000 covering a ten-mile section at Dunkirk and a six-mile section at Ripley.

SEND COUPON FOR FACTS AND PHOTOS OF THIS AND OTHER JOBS

Dumpcretes can reduce:

Capital investment in equipment • Confusion at paving site • Downtime and labor costs • Wide shoulder maintenance.

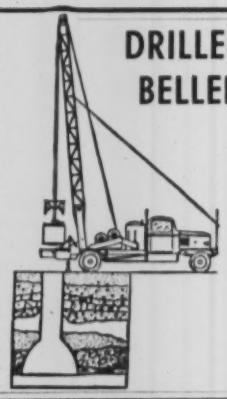
Dumpcretes can give you:

Lower operating costs • *Flexible* delivery to paving site *and* structures • Closer quality control • Better production.

MAXON CONSTRUCTION COMPANY, INC.
Manufacturing Division 12
2600 Far Hills Building, Dayton 9, Ohio

Please send Dumpcrete paving brochure, specifications and bulletins.

NAME _____
TITLE _____
FIRM _____
ADDRESS _____
CITY _____ ZONE ___ STATE ___



DRILLED PILING and BELLED CAISSONS | *consultants on foundation problems*

SHORING & BRACING, FORMATION TEST HOLES, ELEVATOR SHAFTS, DE-WATERING AND UNDERPINNING . . .

CAISSON SIZES....16" to 84"
BELL SIZES.....2' to 15'
SHAFT DEPTHS.....to 200'

CASE FOUNDATION CO.
BOX 298, ROSELLE, ILL.
Phone: (Chicago) - - Columbus 1-0290

DETROIT OFFICE
1380 PENOBSCOT BUILDING • WOodward 8-3818

▲ **O., Rossford**—APARTMENT, etc.—Clifford C. Loss, 5824 Buchanan Dr., Toledo, apartment and swimming pool, 11½ acre site facing Maumee River, southern boundary of village. **$1,000,000.**

▲ **O., Toledo**—APARTMENT—Clifford C. Loss, 5824 Buchanan St., 32-unit co-operative apartment 11½ acres site facing Maumee River southern boundary of Rossford, **$1,000,000.**

▲ **O., Willowick** — SHOPPING CENTER — Shoregate Stores Co., 17903 St. Clair Ave., Cleveland, Zone 10, plans by Weinberg & Teare, Citizens Bldg., Cleveland, Zone 14, 80-100,000 sq. ft. Shoregate Shopping Center addn. Over **$1,000,000.**

▲ **Tex., Galveston**—HOSPITAL—Sealy & Smith Foundation (Hospitals), 816 Strand St., 150-bed psychopathic hospital. **$3,000,000.** To be operated by University of Texas Medical Branch at Galveston.

▲ **Tex., Houston**—HOSPITAL—St. Joseph's Hospital, 1910 Crawford St., plans by Golemon & Rolfe, 5100 Travis St., 11 story hospital, **$4,500,000.** CD 5/3.

▲ **Tex., Houston**—CHURCH, etc.—St. Luke's Methodist Church, 3471 Westheimer St., plans by Mark Lemmon, 201 Thomas Bldg., Dallas, church, school, small auditorium, administrative offices, **$1,350,000.**

▲ **Wash., Seattle**—HOSPITAL—Northwest Memorial Hospital, c/o Hazen & Lawrence, archts., 8626 Roosevelt Way, Zone 15, 120-bed, 1 story hospital, N. 120 St. and Meridan Ave. **$1,500,000.** CD 5/1/56.

▲ **Ont., Tecumseh**—OFFICE, etc.—Green Giant of Canada Ltd., Victoria St., office and administration bldg., new corn production plant 12 mi. east of Windsor. **$1,000,000.**

▲ **Ont., Toronto**—HEAD-OFFICE—Mutual Benefit Health & Accident Assn., 520 University Ave., plans by John B. Parkon Assocs., 1500 Don Mills Rd., suburban type low level head-office bldg. **$1,500,000.** CD 9/13.

▲ **Ont., Toronto**—OFFICE—Ontario Hospital Assn., 135 St. Clair Ave. W., plans by Govan, Ferguson, Lindsay, Kaminker, Langley & Keenleyside, 10 Price St., 10 story office, Yonge St. east side south of Eglinton Ave. **$3,500,000-$4,000,000.**

▲ **Que., L'Assomption**—CHAPEL, etc.—College de L'Assomption, L'Assomption, plans by Orevier, Lemieux & Mercier, 1065 Pratt Ave., Outremont, 3 story chapel, dormitories, gymnasium, laboratories, library, etc. **$2,000,000.**

INDUSTRIAL BUILDINGS

▲ **Ala., Irondale** — DISTRIBUTION CENTER — General Motors Corp., General Motors Bldg., Detroit, Mich., 1 story, 80,000 sq. ft., brick, masonry, bldg. for distr. center. **$1,000,000.**

▲ **Ill., Chicago**—FACTORY, etc.—Mars Inc., 2019 N. Oak Park Ave., plans by Naess & Murphy, 80 E. Jackson Blvd., 1 or 2 story brick factory and warehouse, 2019 N. Oak Park Ave. **$2,000,000.**

▲ **Ill., Peoria**—WAREHOUSE—Kroger Grocery Co., 111 Persimmon St., warehouse. **$2,500,000.**

▲ **Ind., Lafayette**—FACTORY—Rea Magnet Wire Co. Inc., E. Pontiac St., Fort Wayne, plans by Giffels & Vallet, Inc., consult. engr-archts, 1000 Marquette Bldg., Detroit 26, Mich., 280x390 ft., structural steel, masonry, factory. **$1,150,000.**

▲ **N. M., Bluewater**—URANIUM MILL—Kermac Nuclear Fuels Corp., (Kerr-McGee Oil Industries, Inc., Kerr-McGhee Bldg., Oklahoma City, Okla., Pacific Uranium Mines Co., 292 S. LaCienega St., Beverly Hills, Calif., Ambrosia Lake Uranium Co., Oklahoma City, Okla. and Anderson Development Corp., 122 8 St. N.W., Albuquerque, N. M.), uranium mill, near here. **$16,000,000.**

▲ **N. Y., Syracuse**—FURNACE, etc.—Crucible Steel Co. of America, Oliver Bldg., Pittsburgh 22, Pa., vacuum induction furnace, melt shop bldg., metallurgical-chemical laboratory at Sanderson-Halcomb Works. **$1,500,000.** CD 1/24/47.

▲ **Tex., Euless**—PLANT—United States Chemical Milling Corp., c/o Industrial Dpt. of Chamber of Commerce, Dallas, plant, 20-acre tract in New Tide Industrial Park south of Euleswon Hy. 157, **$1,500,000.**

▲ **Wis., Brookfield**—PLANT—W. A. Krueger Co., 3830 W. Wisconsin Ave., Milwaukee, 1 story, bsmt., 150x590 ft. lithography plant and 2 story 40x50 ft. office, **$1,000,000.**

▲ **Wis., Franksville**—LABORATORY—Line Mtls. Industries, 700 W. Michigan St., Milwaukee, engineering research laboratory, **$1,000,000.**

UNCLASSIFIED

▲ **Minn., Maple Grove** (P. O. Osseo)—RECREATION CENTER, etc—G. Hedlund, Osseo, Minn., plans by Patch & Erickson, Wayzata, recreation center N. of Highway 152 and 1.5 mi. W. of Osseo, comprising 56-unit motel, restaurant, etc. **$1,000,000.**

▲ **N. Y., New York**—PIER, etc.—Dpt. Marine & Aviation Pier A, North Pier, New York, Zone 4, Proj. D-49 pier, piershed, bulkhead, shed, etc. at Pier 36 North River, **$2,500,000.** Tumarkin, Morgan & Emerman, 140 Nassau St., New York, Zone 38, engrs. Construction in 1960. CD 8/15/55.

▲ **Tex., Denison**—TERMINALS YARDS, etc.—Missouri-Kansas-Texas R.R. System, St. Louis, Mo., expansion of Ray Terminal Yards **$1,500,000;** office and bldg. operational program. **$1,000,000.**

▲ **Que., Cap de la Madeleine**—WHARF — National Harbors Comm., Parliament Bldgs., Ottawa, Ont., wharf on St. Lawrence River near Cap de la Madeleine, **$2,000,000.**

Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
June 3 Connecticvut
STREETS AND ROADS
June 4 Massachusetts

BUILDINGS—LB & CA

▲ **Baltimore Contractors**, Inc., 711 S. Central Ave., Baltimore, Md., CA **$4,748,400.** INTENSIVE TREATMENT BLDG., Conn. State Hospital, MIDDLETOWN, CONN. State P. Wks. Dpt., 165 Capitol Ave., Hartford, Conn. Bids Apr. 17. CD 4/19, under LB.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
June 6 New York
STREETS AND ROADS
May 29 New Jersey June 6 New York
June 7 Pennsylvania

HEAVY CONSTRUCTION—LB & CA

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg. Harrisburg, Bids opened 5/10.

Pa.—**Charles Riebe**, 333 Columbia Ave., Palmerton, Pa., LB **$143,312** (9 bidders) 3,215 ft. crushed aggreg. base with bit., 3 rein.-con. bridge decks, LR 45027 (1), Monroe Co.; LB **$153,747** (4 bidders) widn. 20,347 ft. existing road with crushed aggreg. base, and bit. LR 49015-18, Coal and Mt. Carmel Twps., Northumberland Co.;

Pa.—**Sanctis Constr. Inc.**, 410 Marlow St., Pittsburgh 20, Pa., LB **$632,369** (3 bidders) 6,301 ft. divided hy. c.conc., 1 deck I-beam bridge T. R. 51, Bridgewater Boro, Beaver Co.;

Pa.—**The Interstate Amiesite Corp.**, Box 868, Wilmington, Del. LB **$110,670** (4 bidders) surf. 23,337 ft. existing road with bit. T. R. 219, Greenwood & Penn Twps., Grampian Boro, Clearfield Co.;

Pa.—**Ezra Stipp Constr. Co.**, Love Rd., Scranton 8, Pa., LB **$340,589** (4 bidders) 1,180 ft. c.conc. base with bit. 1 prestressed precast rein.-con. bridge, L. R. 5, Scranton, Lackawanna Co.;

Pa.—**Hempt Brothers, Inc.**, R. D. 1, Camp Hill, Pa., LB **$5,502,320** (3 bidders) 29,960 ft. c.conc. divided hy., 3 plate girder and 5 I-beam bridges, T. R. 22-322, Derry Twp. and Lewistown Boro, Mifflin Co.;

Pa.—**Frank Mashuda Co., Inc.**, Evans City, Pa., LB **$1,913,124** (4 bidders) 15,021 ft. divided hy. c.conc. 1 I-beam bridge, T. R. 31, S. Strabane and Somerset Twps., Washington Co.;

Pa.—**Adam Edemiller Inc.**, Greensburg, Pa., LB **$1,555,927** (4 bidders) 9,900 ft. divided hy. c.conc. with earth divisor, one I-beam and one plate girder bridge, T. R. 31, Hempfield Twp., Westmoreland Co.;

Pa.—**Allegheny Contg. Industries, Inc.**, 801 Bingham St., Pittsburgh 3, Pa., LB **$127,952** (3 bidders) 3,725 ft. crushed aggreg. base with bit. L. R. 02082 (5), West Mifflin Boro, Allegheny Co. CD 4/22.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg., Harrisburg,

Pa.—**Kaufman Constr. Co., Inc.**, 4000 Pulaski Ave., Phila., Pa., LB **$4,932,706** (8 bidders) 9-span plate girder bridge and 2 rein.-con. T-beam spans and 5 deck I-beam bridges, University and Grays Ferry Ave., L. R. 67057 (8), Philadelphia Co.;

Pa.—**High Welding Co.**, 1911 Old Philadelphia Pike, Lancaster, Pa., LB **$258,006** (6 bidders) repairing existing bridge 848 ft. T. R. 106 Carbondale, Lackawanna Co. Bids May 10. CD 4/22.

▲ **MARYLAND**—State Rd. Comm., 108 E. Lexington St., Baltimore, Zone 2, Bids opened 5/14,

Md.—**Charles W. Williams, Inc., and 41st Street Corp.**, 2210 Maryland Ave., Baltimore, Md., LB **$889,914.** surf. 2.042 mi. Baltimore Beltway, incl. constr. dual 3-span steel beam bridges over Nursery Lane, Contr. AA 460-520 and AA 460-2-520, Anne Arundel Co.;

Md.—**J. O. and C. M. Stuart, Inc.**, 3121 South St. N. W. Wash., D. C., LB **$2,177,373.** surf. 2.838 mi. dual hy. Washington National Pike, constr. two 3-span steel beam bridges and one 3- span plate girder bridge, Contr. M 485-22-23-33-320, Montgomery Co. CD 4/29.

BUILDINGS—LB & CA

▲ **John W. Cowper Co., Inc.**, 775 Main St., Buffalo, N. Y. CA Est. **$5,000,000.** 7 story OFFICE BLDG., 80-acre plot adjacent to production area, LACKAWANNA, N. Y. Bethlehem Steel Co., Bethlehem, Pa. CD 5/21/56.

▲ **Green Tree Manor Homes**, c/o Long Island Homes, 168-12 Hillside Ave., Jamaica 32, N. Y. Owner Builds, **$3,900,000.** 300 HOUSES, Sunrise Highway, LINDENHURST, N. Y.

▲ **Godfrey Nurse Houses, Inc.**, 1775 Broadway, New York 19, N. Y. Separate Contracts. **$20,000,000.** Lenox Terrace HOUSING, incl. six 16 story buildings, 1,716 units on 3 blocks, between 5 Ave., Lenox Ave., W. 132 St. and W. 135 St. Title I, NEW YORK, N. Y. CD 8/13.

▲ **Engineering & Constr. Div., Koppers Co., Inc.**, Koppers Bldg., Pittsburgh 19, Pa. CA Est. **$3,000,000.** rebuilding Battery 2, at Neville Island PLANT, PITTSBURGH, PA. Pittsburgh Coke & Chemical Co., Grant Bldg., Pittsburgh, Pa.

SOUTH

BUILDINGS—LB & CA

▲† **Paul Tishman, Inc.**, 21 E. 70 St., New York 2, N. Y. LB **$14,371,808** Base Bid. 800-1,500-bed NAVAL HOSPITAL, NOy 89463, Spec. 47332, PORTSMOUTH, VA. P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Norfolk 11, Va. Bids May 14. CD 4/2.

▲ **Batson, Cook Co.**, Box 151, West Point, Ga., CA **$3,756,955.** Northeast Florida State MENTAL HOSPITAL, McCLENNY, FLA. Bd. Comrs. State Institutions, 33 W. Adams St., Jacksonville, Fla. Bids Apr. 26, awarded May 7. CD 5/8, under LB.

▲ **Metal & Thermit Corp.**, 100 Park Ave., New York 17, N. Y. Separate Contracts. **$3,000,000.** CHEMICAL PROCESSING PLANT, OFFICE, WAREHOUSE and STEAM PLANT, near CARROLLTON, KY. CD 11/19.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
May 28 Indiana, Michigan June 4 Wisconsin
June 5 Michigan
STREETS AND ROADS
May 28 Indiana June 5 Michigan

▲ **ILLINOIS**—BA 6/6—Illinois State Toll Hy. Comm., 20 N. Wacker Dr., Chicago,

Contr. E-1-A, grading, drainage, paving, appurtenances, erecting precast concrete, steel bridges, 3.67 mi. W. of Deerpath Rd. extending easterly W. of State Rte. 31, Aurora, $4,500,000. Vogt, Ivers, Seaman & Assocs., 20 N. Wacker Dr., Chicago, Ill., section engrs.

Contr. T-5-A, grading, drainage, paving, appurtenances, erecting precast concrete bridges, 3.45 mi. E. of Wolf Rd. extending westerly and northerly to point N. of centerline of CB & Q. R.R., Lyons Twp., $4,000,000.

Contr. T-5-B, grading, drainage, paving, appurtenances, erecting precast concrete bridges 4.9 mi. N. of centerline of CB & Q R.R., extending northerly N. of 31 St. in Provison Twp., $2,000,000. Harza Eng. Co., 20 N. Wacker Dr., Chicago, section engr. latter 2 projects. CD 5/11/56.

RESEARCH DATA RELEASED BY DUR-O-WAL

Independent Study Now Available to Industry

In an effort to obtain pertinent information as to how joint reinforcing actually affects the strength of masonry construction, Dur-O-waL sponsored a program of research carried on by the Research Foundation of the University of Toledo in 1956. The study was designed to provide data on the following items:

1. The relative lateral strength of walls constructed with various types and amounts of reinforcing.

2. The relative effectiveness of various types and amounts of reinforcing used in walls laid up with mortars of widely varying strengths.

3. The effect of deformation in the side rods on the bond in both weak and strong mortars.

4. The effect on bond of the joints formed by the side rods and cross rods.

5. The effect of deforming on the strength of the side rods.

A total of 39 walls, 9'-4" x 4' were built and tested. More than two dozen tension tests were made on plain and deformed wires; 80 pull-out tests were made to determine bond characteristics.

Guide for Comparison

Three points of importance in comparing quality —

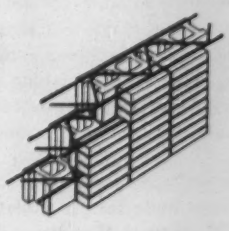
1. Weight of material
   a. Comparison of actual weight per 1000 lineal feet.
   b. Flexural strength in relation to weight of steel in wall.
2. Deformation
   a. Report of tests
3. Mortar Locks
   a. Report of comparative tests

Dur-O-waL Distribution

More than 8,000 dealers stock Dur-O-waL, which is distributed in key markets throughout the United States. It is readily available in your area now.

Widening Design Horizons

By scientifically combining steel with concrete, architects are provided with new freedom of design and new economy of construction. Dur-O-waL is designed to fill a basic need for an economical, fabricated reinforcing member for masonry walls. You are invited to send for your copy of the research findings to learn how this truss design member provides superior lateral and horizontal reinforcing.



Adequate Manufacturing Facilities

Dur-O-waL is manufactured by the Dur-O-waL Division, Cedar Rapids Block Company, Cedar Rapids, Iowa; Dur-O-waL Products, Inc., Box 628, Syracuse, N.Y.; Dur-O-waL of Illinois, 119 N. River Street, Aurora, Illinois; Dur-O-waL Products of Alabama, Inc., Box 5446, Birmingham, Alabama; Dur-O-waL Products, Inc, 4500 E. Lombard St., Baltimore, Md.; Dur-O-waL Div., Frontier Mfg. Co., Box 49, Phoenix, Ariz.; and Dur-O-waL., Inc., 165 Utah St., Toledo, Ohio.

Advertisement

HEAVY CONSTRUCTION—LB & CA

▲ **Raymond S. Barry, Inc.,** 1580 King Ave., Columbus, O., Owner Builds, **$5,000,000.** 140 quality HOMES, in Westwood Acres Development, COLUMBUS, O.

BUILDINGS—LB & CA

▲ **Huber, Hunt & Nichols, Inc.,** 2450 S. Tibbs St., Indianapolis, Ind., CA Est. over **$30,000,000.** general contract new ASSEMBLY PLANT, Brownhelm Twp., LORAIN, O. Ford Motor Co., The American Rd., Dearborn, Mich. Awarded May 8. CD 7/16.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

May 28 Iowa — June 4 Kansas

June 11 South Dakota

STREETS AND ROADS

May 28 Iowa — June 4 Kansas, Wisconsin

▲† **Okla., Pryor**—FACILITIES—BA 6/20— U. S. Eng., P.O. Box 61, Tulsa, Zone 2, nitro-guanidine facilities (production area) Oklahoma Ordance Works, ENG-34-066-57-55. $3,000,000-$7,000,000. Plans deposit $150. CD 5/7.

HEAVY CONSTRUCTION—LB & CA

▲† **Western Constr. Corp.,** 400 Benson Bldg., Sioux City, Ia., CA **$5,044,552.** approach fill at Chicago, St. Paul & Pacific R.R. Bridge, at Missouria River, Inv. 24-066-57-92, near Mobridge, SOUTH DAKOTA. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids May 2. CD 5/8, under LB.

▲† **Nolan Bros., Contractors, Inc.,** Box 9157, Fort Worth, Tex., CA **$12,307,729.** runway, taxiways, aprons, Sheppard Air Force Base, ENG-34-066-57-51, WICHITA FALLS, TEX. U. S. Eng., Box 61, Tulsa 2, Okla. CD 5/3, under LB.

BUILDINGS—LB & CA

▲† **C&B Contracting Co.,** 879 Whittington St., Hot Springs Ark., CA **$2,640,101;** imprv. 143 modified emergency type BARRACKS, DA 03-006-AIV-2444, FORT CHAFFEE, ARK. U. S. Army Training Center, Field Artillery, Post Purchasing & Contracting Office, Fort Chaffee, Ark.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

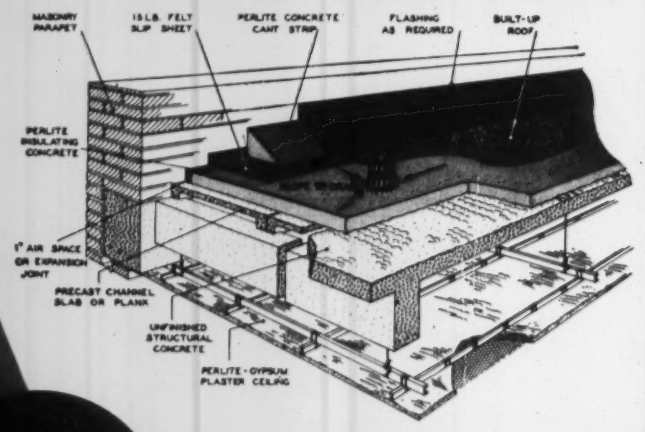
June 12, 13 California

STREETS AND ROADS

June 5, 6, 12, 13, 19 California

PERLITE

insulation value 50% more than others for structural or precast roof slabs



- Eliminates need for grouting
- Smooths surface for roofing
- Provides drainage slope
- Insulates for life

For roof fill insulation over structural concrete and prestressed or ordinary precast roof slabs, perlite insulating concrete offers economy, efficiency and versatility in conforming to all roof shapes.

It provides an excellent "U" value at minimum cost, permits casting drainage slopes monolithically, requires no finishing of structural roof slab (with important labor savings) and forms an excellent textured base for built up roofing. Perlite **insulating** concrete-1:6 mix has a dry weight of 27 pcf and a "k" of 0.58.

In addition, perlite insulating concrete assures an insulated, fire-safe roof deck that is **all** concrete. Write for our Bulletin 2-E for further information. **PERLITE INSTITUTE,** 45 West 45th Street, New York 36, N. Y.

BUILDINGS—BA

▲† **Ariz., Yuma**—HOUSING—BA 7/9—Procurement Office, Air Defense Wing, Vincent Air Force Base, Yuma, 320 armed services housing, Vincent Air Force Base, Inv. No. 02-606-57-7. $3,750,000. CD 9/13, under LB.

HEAVY CONSTRUCTION—LB & CA

▲† **Peter Kiewit Son's Co.,** 1300 Aloha St., Seattle, Wash., LB **$10,874,360** (4 bidders) constr. Eagle Gorge Dam on Green River, Kanasket, Inv. 57-44, WASHINGTON. U. S. Eng., 4735 E. Marginal Way, Seattle 4, Wash. Bids May 10. CD 5/2.

▲ **CALIFORNIA**—State Dpt. P. Wks., 1120 N St., Sacramento,

Cox Bros. Constr. Co., & J. E. Haddock, Ltd., P. O. Box C, Stanton, Calif., CA **$2,570,432.** grading, surf. 2.3 mi. San Diego Freeway and constr. 1 undercrossing and 3 overcrossings, in City of San Clemente, between San Mateo Creek and 0.1 mi. south of Avenida, Cadiz, San Diego and Orange Counties. Bids Apr. 25, awarded May 9. CD 5/2, under LB.

▲ **CALIFORNIA**—State Div. Hys., 1120 N. St., Sacramento, Bids opened 5/15,

Calif. McCammon-Wunderlich Co. & Wunderlich Constr. 2555 Pulga Rd., Palo Alto, Calif. LB **$7,292,214** (7 bidders) grading 2.6 mi. railroad roadbed and realigning 13.3 mi. U. S. 40 alternate between Wick's Corner North of Oroville, incl. rein.-con. slab bridges at Gold Run Creek and Flag Canyon Creek and welded girder overheads at Pentz and Cherokee as part of relocation work to make way for constr. Oroville Dam, Butte Co. CD 4/12.

▲ **Peter Kiewit Sons Co.,** 442 Post St., San Francisco Calif. LB **$8,499,235** (5 bidders) boring 2 tunnels, 4,400 ft. and 8,800 ft. long, as part of relocating Western Pacific R.R. to make way for constr. Oroville Dam on Feather River, Feather River Proj., Oroville Dam, CALIFORNIA. California Dpt. Water Resources, 1120 N. St., Sacramento, Calif. Bids May 15. CD 4/23.

▲ **Hyperian Constructors,** 816 W. 5th St., Los Angeles, Calif. LB **$20,297,530** (4 bidders) ocean outfall for effluent disposal at Hyperian Treatment Plant, LOS ANGELES, CALIF. City Council, City Hall, Los Angeles, Calif. Bids May 15. CD 4/11.

▲† **Parish Bros. & Harms Bros.,** P. O. Box 6, Benicia, Calif. CA Sch. A **$2,941,034;** add. **$496,249.** runway parallel and facilities, ENG-57-49, TRAVIS AIR FORCE BASE, CALIF. U. S. Eng., 1209 8th St., Sacramento, Calif. Bids Apr. 26, awarded May 10. CD 5/9, under LB.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

May 29 Ontario

STREETS AND ROADS

May 29 Ontario

HEAVY CONSTRUCTION—LB & CA

▲ **Majestic Contractors Ltd. & Associates of Edmonton,** 450 Royal Trust Bldg., Edmonton, Alta., CA **$3,817,207,** Section A 80.4 mi. Trans-Canada gas pipe line between Manitoba-Ontario border and the lakehead, ONTARIO. Northern Ontario Pipeline Crown Corp., 56 Lyon St., Ottawa, Ont. Awarded May 10. CD 5/3, under LB. Grand total $15,556,427.

Morrison-Shivers Ltd., Leaside, Toronto, Ont., CA **$4,567,015** section B, 94.1 mi. gas pipe line (Ontario).

Dutton-Williams Bros. Ltd., 5440 1 St. S.W., Calgary, Alta., CA **$3,678,776,** Section C, 57.7 mi. Trans-Canada gas pipe line (Ontario);

Houston Contg. Co. Ltd., Winnipeg, Man., CA **$3,493,429,** Section D, 78.5 mi. Trans-Canada gas pipe line (Ontario).

BUILDINGS—LB & CA

▲ **Poole Constr. Co. Ltd.,** 2402 2A St. E., Calgary, Alta., CA **$2,500,000.** rein-con. DEPARTMENT STORE, 16 Ave. and 14 St. Northwest, CALGARY, ALTA. Simpsons-Sears Ltd., Calgary, Alta. J. Stevenson & Assocs., Calgary, Alta., archts. Awarded May 7.

▲ **Redfern Constr. Co. Ltd.,** 36 Toronto St., Toronto, Ont., LB **$10,943,700** (6 bidders) 14 story, with 300 ft. frontage OFFICE BLDG., Adelaide St. E. and Victoria St., TORONTO, ONT. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. Bids May 1. CD 3/18.

▲ **Stearns-Roger Eng. Co. Ltd.,** Calgary, Alta., CA Est. **$5,000,000.** POTASH CONCENTRATOR PLANT and SURFACE PLANT, SASKATOON, SASK. Potash Co. of America, Carlsbad, N. M. U. S. A. CD 1/16.

LATIN AMERICA

BUILDINGS—LB & CA

▲ **Foster Wheeler Corp.,** 165 Broadway, New York 6, N. Y., U.S.A. CA Est. **$33,000,000.** design, procurement and constr. 55,000 bbl. per day REFINERY, COLON, PANAMA. Panama Refining & Petrochemical Co., Inc., Panama City, Republic of Panama. CD 6/19.

(Proposal Advertisement see pp. 121 to 123)

ANOTHER CATERPILLAR FIRST!

CERTIFIED POWER

FOR CAT* DIESEL ENGINES

CATERPILLAR TRACTOR CO.

ENGINE POWER CERTIFICATION

This is to certify that the Diesel Engine herein described has been engineered, manufactured and tested in accordance with rigid Caterpillar Standards. The materials and workmanship incorporated into this engine give it the inherent capacity for satisfactory performance when applied in accordance with the power ratings established and recommended by this company. The MAXIMUM OUTPUT capacity of this standard production engine is 200 H.P. @ 2000 R.P.M. equipped with: air cleaner, water pump, lubricating oil pump, fuel pump, and standard intake and exhaust manifolds.

I certify that R. L. Henson Supervisor of Diesel Engine Test, Caterpillar Tractor Co., [illegible] Certification and I affix my [illegible] 19 57

[illegible] /58

R.L. Henson
Supervisor Diesel Engine Test
Caterpillar Tractor Co.
Peoria, Illinois

Caterpillar Model D326 Industrial was manufactured and shipped as follows: Engine Serial No 3981018 Shipping Date February 11, 1957

Power Setting 152 H.P. @ 1600 R.P.M. Intermittent Power Rating

Accessories:

- Radiator & Fan
- Ether Starting Aid
- 32V Charging Generator
- Governor Control
- Tachometer Drive
- Muffler
- Heater Connections
- Remote Shut-off

POWER RATINGS

MAXIMUM OUTPUT is the horsepower capacity of the engine, a measure of the maximum power, ± 5%, that can be developed for five minutes without drop in speed.

INTERMITTENT HORSEPOWER is a rating for use in variable load applications such as excavators, hoists, and standby power units, where the duration of sustained full power output is one hour or less, with the average output not over 80% of Intermittent Horsepower.

RATED HORSEPOWER is a rating for use in applications such as planing mills, hammer mills, and rock crushers where the duration of sustained full power output is 12 hours or less.

CONTINUOUS HORSEPOWER is a rating for use in applications such as work boats and pumps where the duration of sustained full power output is 24 hours per day, day in—day out.

Horsepower figures are established in accordance with rigid Caterpillar standards. All ratings, corrected to sea level barometric pressure (29.92 in. Hg.) and standard temperature (60°F), apply to a production engine including air cleaner, water pump, lubricating oil pump, fuel pump and standard intake and exhaust manifolds. The above ratings are based on British and American RHP.

Printed in U.S.A.

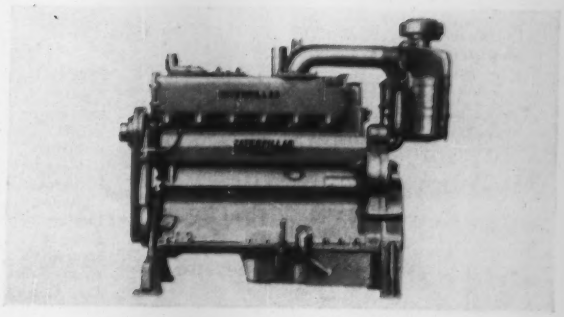
FORM NO. SIS-33552

In a quarter century of diesel leadership Caterpillar Engines have achieved a reputation for *honestly rated power*. Owners have found that they can depend on a Cat Diesel to deliver the power promised.

Now, to back this reputation, Caterpillar becomes the *first* manufacturer to issue a certificate showing the horsepower capabilities of the engine. This certificate is signed by Caterpillar Tractor Co. and certified by a notary public.

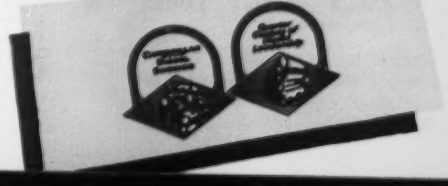
You have a right to demand *certified power* when you invest in an engine. You get it when you buy from your Caterpillar Dealer. Let him show you the certified power plant that fits your needs.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.



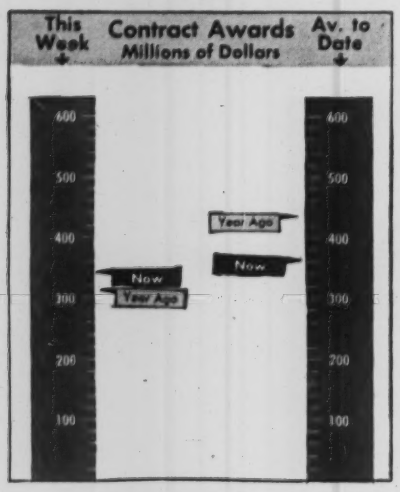
CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



Construction Scoreboard

Activity this Week



AMOUNT OF CONTRACTS LET

By Ownership	This Week	Cum. 21 wks 1957	Chge %
	millions		
Federal	$49.0	$1,209.9	+65
State and Municipal	96.0	2,793.7	+10
Total Public	145.0	4,003.6	+22
Total Private	193.9	3,581.6	−39
U. S. Total	$338.9	$7,585.2	−17
By Type of Work			
Waterworks	$2.8	$175.3	+46
Sewerage	11.1	179.3	−28
Bridges	6.2	273.5	+19
Highways	42.2	1,142.9	+20
Earthwork, Waterways	19.5	529.3	+86
Buildings:			
Public, Excl. Housg.	32.3	885.6	+10
Public Housing	4.2	289.9	+90
Private Housing	91.0	1,242.1	−51
Commercial	28.9	717.4	−6
Industrial	72.0	1,415.1	−39
Unclassified	28.7	734.8	−6
U. S. Total	$338.9	$7,585.2	−17

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

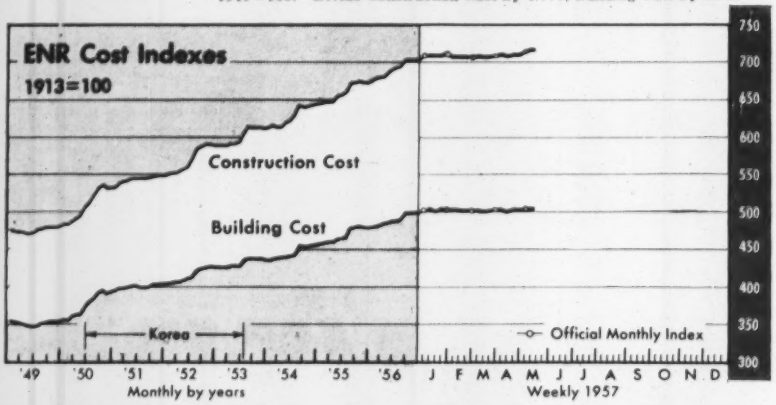
NEW CAPITAL FOR CONSTRUCTION

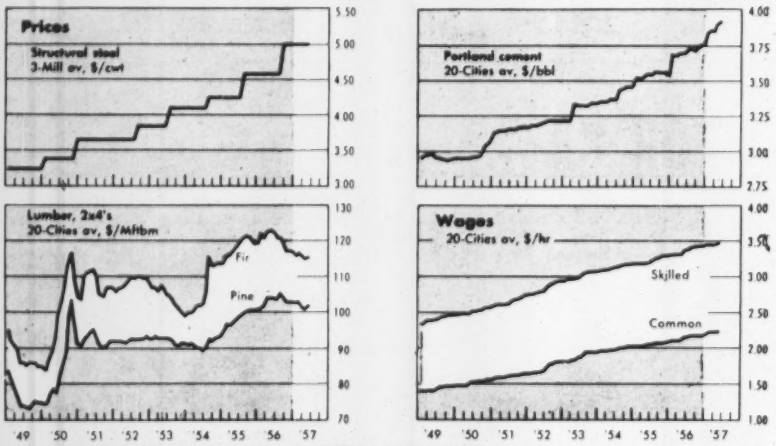
	Week of May 16	Cum. 20 wks 1957	Chge '56-'57 %
	millions		
Corporate Securities	$61.6	$2,325.8	+35
State and Municipal:			
All Except Housing	146.9	2,258.1	+29
Housing	...	41.5	+104
Federal Loans	2.0	83.4	+79
Federal Aid	...	250.0	...
Total Nonfederal	$210.5	$4,958.8	+40
Federal Appropriations:			
In U. S.	...	$0.9	−97
Outside U. S.	...	...	...
Total New Capital	$210.5	$4,959.7	+39

Cost Indexes as of Now

ENR INDEXES (1913 = 100), 20-cities' average	Week of May 16 1957	% Change from April 18 1957	% Change from May 17 1956
Construction Cost	718.45	+1.1	+4.4
Building Cost	503.31	+0.3	+3.2

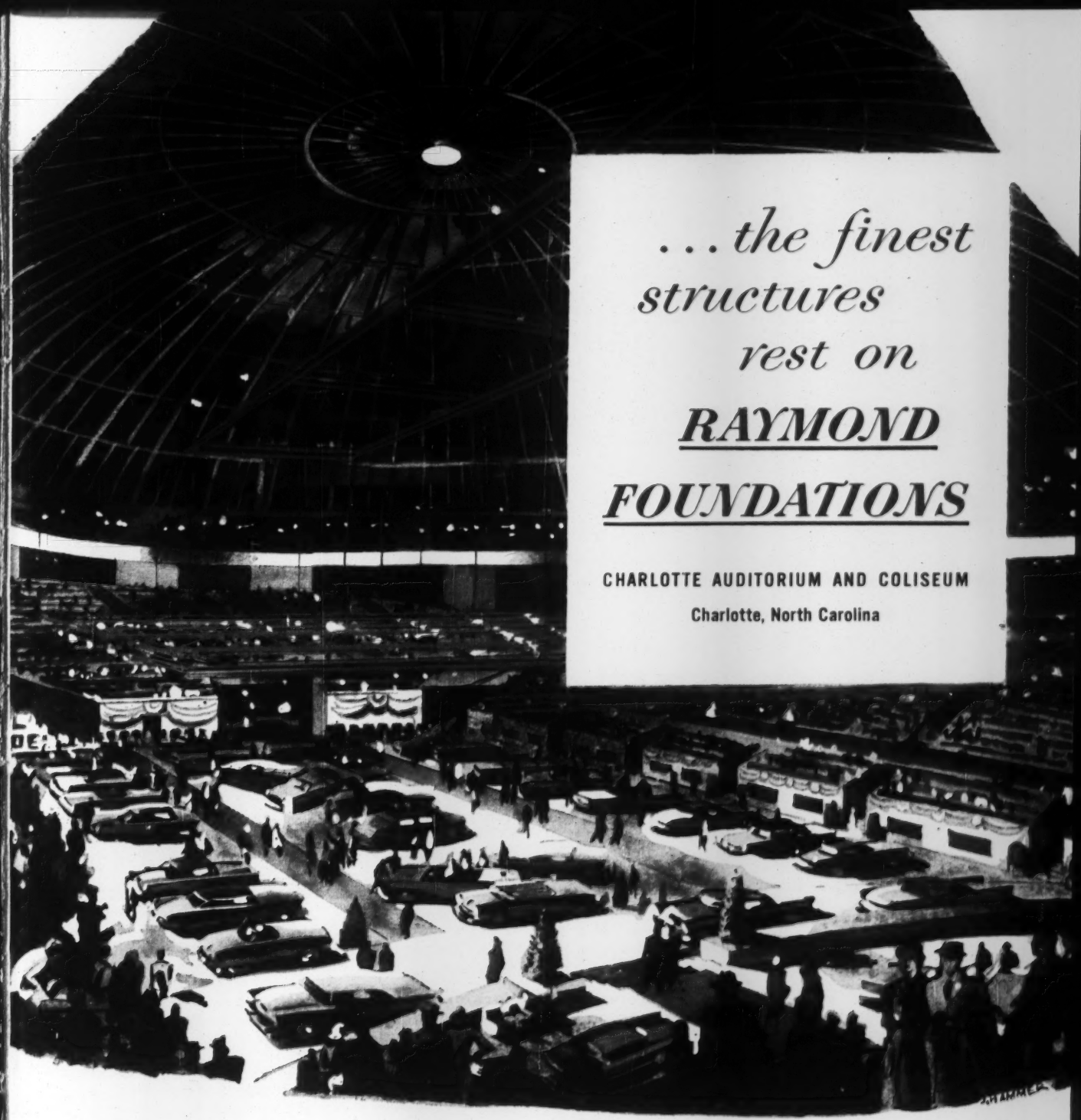
To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518





ENR COST INDEXES IN 22 CITIES, 1913 = 100

City	Construction Cost May 1957	Construction Cost Percent Change from last Month	Construction Cost Percent Change from last Year	Building Cost May 1957	Building Cost Percent Change from last Month	Building Cost Percent Change from last Year
Atlanta	523	0	+4.2	442	0	+4.2
Baltimore	643	0	+8.2	500	0	+1.7
Birmingham	556	0	+1.1	457	0	+2.3
Boston	748	+0.3	+0.4	515	+0.4	+2.2
Chicago	791	+0.2	+2.3	507	+0.3	+1.8
Cincinnati	713	+0.4	+4.9	489	+0.5	+2.8
Cleveland	856	+4.1	+8.0	522	+2.2	+5.0
Dallas	525	0	+2.7	439	0	+3.0
Denver	702	0	+4.8	510	0	+4.6
Detroit	809	0	+3.8	528	0	+4.2
Kansas City	735	+3.2	+3.7	503	0	+1.3
Los Angeles	731	0	−0.7	496	+0.5	+1.2
Minneapolis	753	−0.7	+1.6	522	−1.0	+2.3
New Orleans	572	+1.8	+4.2	467	+1.2	+3.1
New York	853	0	+4.2	579	0	+4.1
Philadelphia	780	+4.0	+8.1	560	+0.6	+4.5
Pittsburgh	762	0	+10.7	541	0	+8.2
St. Louis	789	+3.7	+3.9	539	+1.7	+2.3
San Francisco	722	−0.2	−0.7	489	−0.2	+2.2
Seattle	749	0	+4.1	456	0	+2.7
U. S.—20 Cities' avg.	716	+0.9	+4.0	503	+0.3	+3.2
Montreal	584	+0.7	+4.6	449	+0.9	+3.1
Toronto	611	+1.7	+8.7	469	+0.5	+4.3



. . . the finest structures rest on

RAYMOND FOUNDATIONS

CHARLOTTE AUDITORIUM AND COLISEUM

Charlotte, North Carolina

GENERAL CONTRACTOR: Thompson & Street Co.
STRUCTURAL ENGINEERS: Severud-Elstad-Krueger
ARCHITECTS: A. G. Odell, Jr. & Associates

FOUNDATIONS FOR THE STRUCTURES OF AMERICA . . .

COMPLETE CONSTRUCTION SERVICES ABROAD

AROUND THE WORLD FOUNDED 1891

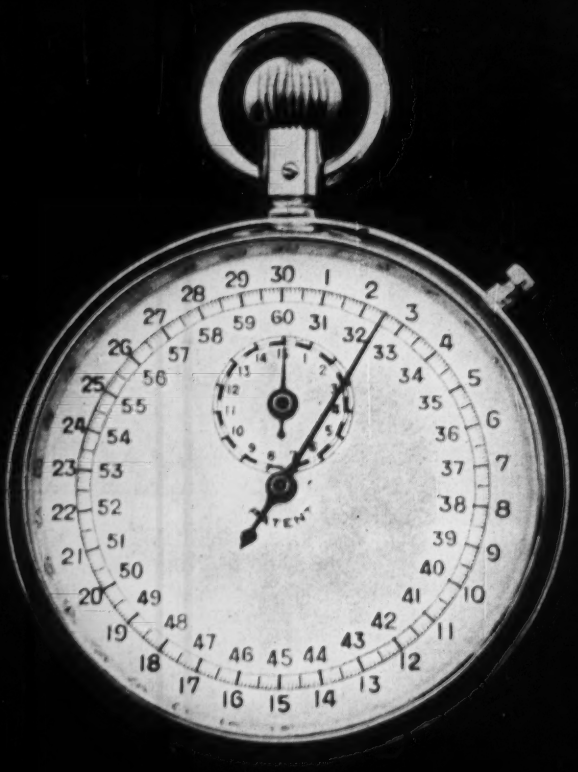
RAYMOND
CONCRETE PILE CO.

OUR 60th YEAR

140 Cedar Street • New York 6, N. Y.

Branch Offices in principal cities of the United States. Subsidiaries in Canada, Latin America and other countries.

You are cordially invited to send for our new Highway Brochure, which gives a detailed resume of how Raymond can help you and the National Highway Program. Just write Dept. E-10, Raymond Concrete Pile Co., 140 Cedar Street, N. Y. 6, N. Y.



Bonds fast

A trained bond specialist will be at your side in no time if you call your Travelers agent.

He's a down-to-earth expert who knows your construction bond problems. He's an authority on local requirements—knows just what you need and what you don't need.

And he's backed by The Travelers—a firm with a nationwide reputation for getting bonds to responsible contractors FAST.

The Travelers complete service for contractors also includes:

Workmen's Compensation and Public Liability insurance with effective safety engineering to reduce accidents.

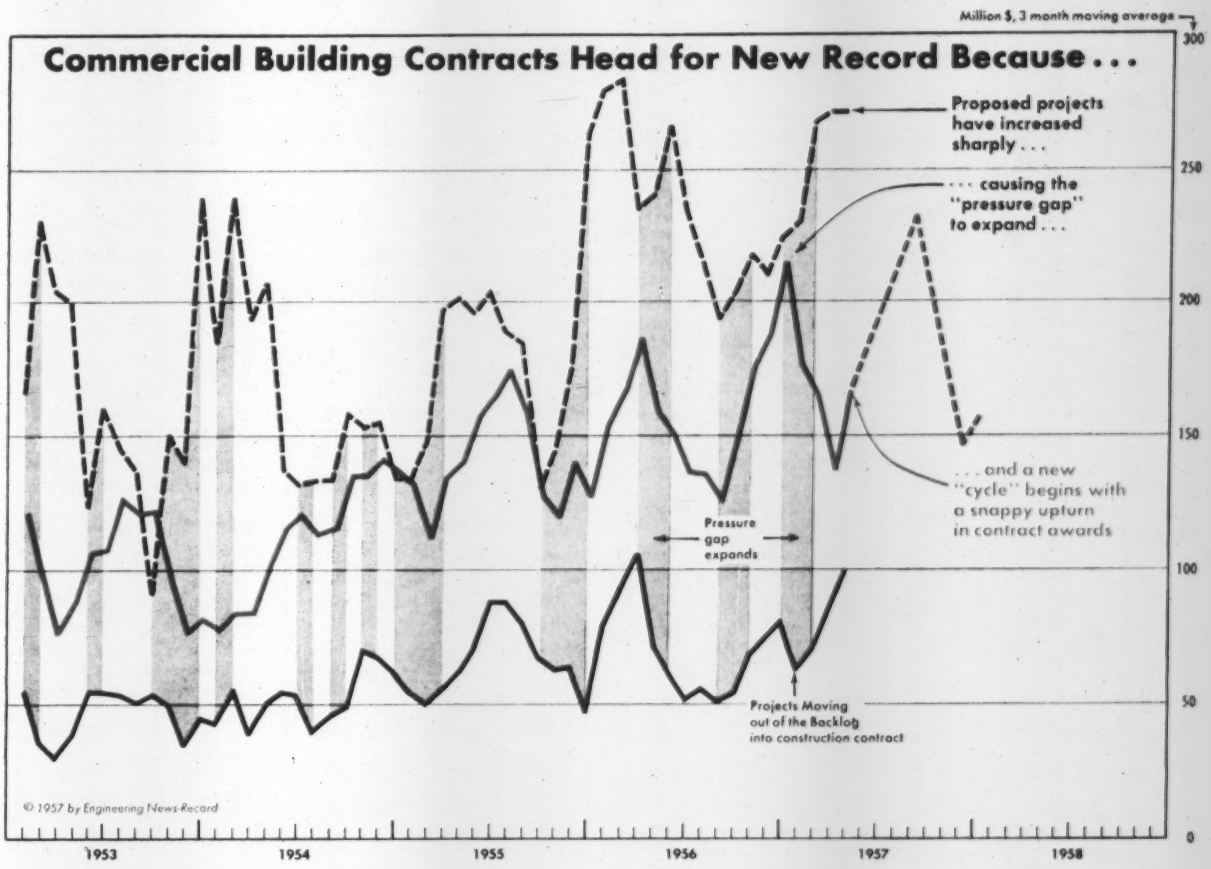
Contractor's Equipment Floaters and Builders' Risk insurance serviced by a nationwide claim organization that can give you prompt attention anywhere.

YOU WILL BE WELL SERVED BY

THE TRAVELERS

INSURANCE COMPANIES, HARTFORD 15, CONNECTICUT

All forms of business and personal insurance including
Life • Accident • Group • Fire • Marine • Automobile • Casualty • Bonds



Commercial Building Begins New Boom

Spring's sunny skies have brightened the outlook for commercial building, an outlook that was bleak in January and February.

While nature lovers were concentrating on robins, business-minded builders sought and found an encouraging sign of their own: An upsurge of projects moving into the design stage indicates that commercial building may match the 1956 record or even set a new one.

To some extent, this is surprising. Earlier this year (ENR Feb. 21, p. 54), ENGINEERING NEWS-RECORD predicted that commercial building awards would dip 7% below 1956's record $2.05 billion, winding up with a $1.9 billion total for the second best year on the books.

Now there's reason to believe that the $1.9 billion estimate will be topped —and perhaps the record that was set in 1956 as well.

The first two months of 1957 offered comparatively little in commercial construction awards. But there was an abrupt change that pushed contracts to new monthly highs both in March and in April. At the end of February, awards trailed the same two months in 1956 by some 49%. But the rush of contracts in the past two months has narrowed this gap to only 8%.

• **Cyclical pattern**—While such year-to-year comparisons of the monthly commercial building contracts are interesting, they actually are poor indicators of the trend. The reason is that commercial building contracts show a clear cyclical pattern in recent years.

The chart above (note color line) shows the waves or cycles of commercial building contracts from 1953 to the present. With one possible exception (the period from December 1953 to February 1955), these cycles have lasted less than a year, in most cases about eight months from trough to trough or peak to peak. The dotted portion of the curve in the chart shows what the newest cycle probably will look like.

If this cyclical pattern develops along the lines now expected, 1957 commercial building awards will be a good bet to top last year's all-time high, at least by a modest amount.

• **Backlog builds up**—The dynamic factor behind the new upturn in commercial building is the rapid buildup in the number of projects entering the planning stage. There was a steep rise in the volume of commercial projects entering ENR's backlog of proposed construction in the second half of 1956, then a leveling off in April 1957. This is shown by the broken line at the top of the chart—a three months moving average of proposed commercial

Kinnear Rolling Doors

Kinnear Steel Rolling Doors *introduced the* **single-shaft torsion spring.** *It assures uniform spring action . . . uniform regulation of operating ease from a* **single adjustment wheel.** *Many other special features make Kinnear your best door buy! Send for catalog!*

KINNEAR ROLLING DOORS
Saving Ways in Doorways

The KINNEAR Mfg. Co.

1820-40 Fields Ave., Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.

WILD HEERBRUGG

T-1 Optical Repeating Transit

By day or underground, this WILD Instrument offers unprecedented advantages

From its optical excellence to its mechanical precision the T-1 has earned a world-wide reputation for great performance. Users everywhere praise the instrument for its rapid set-up, high accuracy and virtually unlimited versatility!

NOTABLE FEATURES OF THE WILD T-1

- Reads direct to 20 seconds with interpolation to 10 seconds, on both horizontal and vertical scales.
- More than a dozen accessories are available for quick, simple, accurate solution of routine and special problems.
- Built-in illumination for both circles, scale and reticle.
- Rugged, precision construction throughout.

PRICE: $718; f.o.b. Port Washington, N. Y. Tripods extra. Write for Booklet T-1.

WILD HEERBRUGG INSTRUMENTS, Inc.
Main at Covert St. • Port Washington N. Y. • PORt Washington 7-4843
SALES • FULL FACTORY SERVICES

building as reported by ENGINEERING NEWS-RECORD.

During the first four months of 1957, commercial buildings estimated to cost $1.05 billion were added to the ENR list of proposed projects. It was a record for the period and 12% more than the volume entering the planning stage from January through April 1956.

As the volume of buildings going into the planning stage increased, there was an expansion in the "pressure gap." This "pressure gap" represents the difference between the value of new proposed work entering ENR's backlog of proposed commercial building and the value of projects moving out of the backlog and into the contract award stage. This increase in the pressure gap was the tip-off to the now snappy upturn in awards for commercial building.

• **Office buildings boom**—The current rise in commercial awards reflects an upsurge in the volume of office building, beginning in March. During the past eleven weeks, contracts have been let for eight office buildings in the $10 million to $40 million bracket alone.

Three of these will be built in New York City, which still is enjoying its phenomenal postwar boom in this type of construction. The New York City projects include a $40 million office building for Union Carbide Corp., to be built by George A. Fuller; a $28 million building called 100 Church Street, to be erected by Diesel Construction; and a $15 million structure at William and John Streets in Lower Manhattan, to be built by Irons, Reynolds & Snare and Crum & Forster.

Los Angeles will get a $10 million headquarters building for Tidewater Associated Oil Co. and San Francisco will get a $10 million office building for Crown Zellerbach Corp., to be built by Haas & Haynie Construction Co.

Dallas, Pittsburgh and Cleveland also are represented by large office building awards in recent weeks. In Dallas, J. W. Bateson Co., Inc., will build a $19 million combination office building, hotel and parking garage for Southland Life Insurance Co. Tishman Realty Co. will put up a $10 million office building and parking garage in Cleveland, and Uris Properties, Inc., of New York, will build a $15 million office building at Penn Center in Pittsburgh.

Three large shopping center awards also have helped to bolster the commercial building category. Biggest of these is the $20 million Connecticut Post Shopping Center to be built at Milford, Conn., by Atlas Milford, Inc., of Yonkers, N. Y.

A $12 million shopping center in Kansas City, Mo., will be built by Blue Ridge Shopping Center and at Port Jefferson, N. Y., the $12 million Jefferson Station Shopping Center will be built by Sawyer & Dolfinger, Inc., for Port Jefferson Properties.

On a regional basis, only New England topped the 1956 awards at the end of four months. On the same four month basis, New York led all other states in awards with $180 million, 31% of the U. S. total.

After New York, the leading states in the January through April period included: California, $47 million; Connecticut and Texas, $40 million each; Ohio, $34 million; Illinois, $28 million; Pennsylvania, $24 million and New Jersey, $22 million.

Equipment Prices Up in April

Contractors had to dig deeper into their pockets for construction equipment purchases in April, according to the latest government figures.

Manufacturers of construction equipment put higher price tags on nearly half the line of products checked each month by the Bureau of Labor Statistics. The average increase for the month was 0.4%. But prices of four wheel scrapers went up 6.7%; tandem rollers, 5.2%; three wheel rollers, 4.2%; and ripper and rooter equipment, 4%. Others increased from 0.2% to 3%.

Every major group of construction equipment except portable air compressors and contractor air tools shared in the April price markups. Cranes, draglines and shovels, boosted 0.5% in March, went up another 0.8% in April.

The average 0.4% rise in construction equipment prices in April was the largest month to month increase since last November. At April prices, contractors were paying 1% more, on the average, for new equipment than they did last December. Perhaps even more significant is the fact that April prices on construction equipment were up a hefty 8.8% over the same month in 1956. A machine that would have cost a contractor $3,000 in April 1956 would have cost $3,264 in April 1957.

Steel prices, of course, have been a major factor in the increased equipment prices in the past year. Construction equipment manufacturers found it necessary to put substantial price hikes into effect after the settlement of the national steel strike last summer brought with it an increase in basic steel prices. After rising sharply in mid

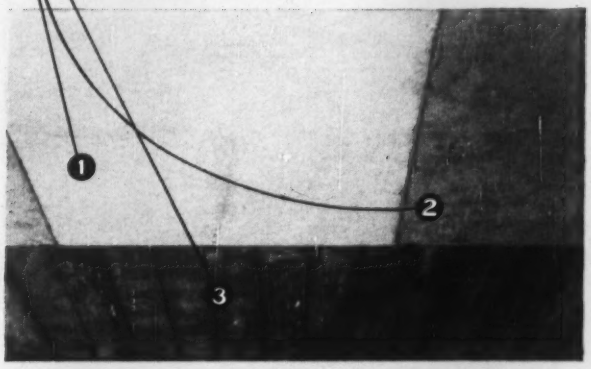
3 reasons why PLYGLAZE® high-density* overlaid plywood outperforms any form material on the market

1. FORMS SMOOTHER CONCRETE

Hard, glossy-smooth fused resin-fiber surfaces form flawlessly smooth concrete, with no trace of grain pattern. Unretouched photo shows marked difference in appearance quality of concrete cast against PlyGlaze, ordinary plywood and shiplap.

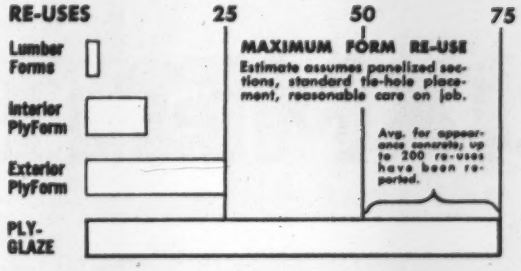
RELATIVE APPEARANCE OF CONCRETE

	Up to 50% of Max. Re-Use	Up to 100% of Max. Re-Use	Where to Use
1. PLYGLAZE	Excellent	Good	For smoothest concrete, maximum re-uses
2. PLYFORM	Good to Fair	Fair to Poor	For fairly smooth concrete, multiple re-uses
3. LUMBER	Poor	Very Poor	Where appearance and re-use not important



2. GIVES MANY MORE RE-USES

PlyGlaze's tough, hard surface stands up under hundreds of pours. With reasonable care, you'll easily get 50 to 75 re-uses. Actually over 200 have been obtained—and even then PlyGlaze continued to form good looking concrete.



3. HELPS CUT COSTS TWO WAYS

A. TIME & LABOR SAVINGS—Sharply reduces rubbing and finishing labor. Ceiling slabs can be painted direct, eliminating expensive plastering. PlyGlaze also cuts form construction, erection and stripping time. High re-use factor eliminates form reconstruction during job.

B. LOW COST PER USE—Even when cost is sole criterion, greater number of PlyGlaze re-uses frequently more than make up for higher initial cost, particularly where costs can be amortized over 25 or more pours.

COST PER-SQUARE-FOOT-PER-USE

No. Re-Uses ➤	1	10	25	50	100	200
PLYGLAZE	$0.375	.038	.015	.008	.004	.002
Exterior PLYFORM	.234	.023	.009	Gives Max. 25 Re-Uses		
Interior PLYFORM	.218	.022	Gives Maximum 10-12 Re-Uses			
LUMBER	.110	Gives Maximum 2-3 Re-Uses				

Estimates based on 30 month average for prices quoted by St. Paul & Tacoma for following material delivered in Chicago: ¾" PlyGlaze; ¾" Ext. & Int. PlyForm, mill oiled, edge sealed; 2 & btr. 1" green Douglas fir or hemlock.

POINTS IN BRIEF

- Has the strength, workability and adaptability of ordinary plywood.
- Strips easily; the non-absorbent surfaces will not stick to the concrete.
- No oiling is needed between the pours other than to facilitate cleaning.
- Overlay will not soften or come loose. Unharmed by alkaline reaction.
- Overlay minimizes moisture pickup and the resultant loss of rigidity.

Hard, glossy, translucent high density fused-resin fiber overlay bonded to both sides of panel. Resin content controlled to give exact amount of hardness and wear resistance required for form work.*

Base panel is top quality D-FPA-Inspected solid core Exterior fir plywood. Available in all standard sizes, thicknesses.

ST. PAUL & TACOMA LUMBER CO.
Dept. RN, Tacoma 1, Washington

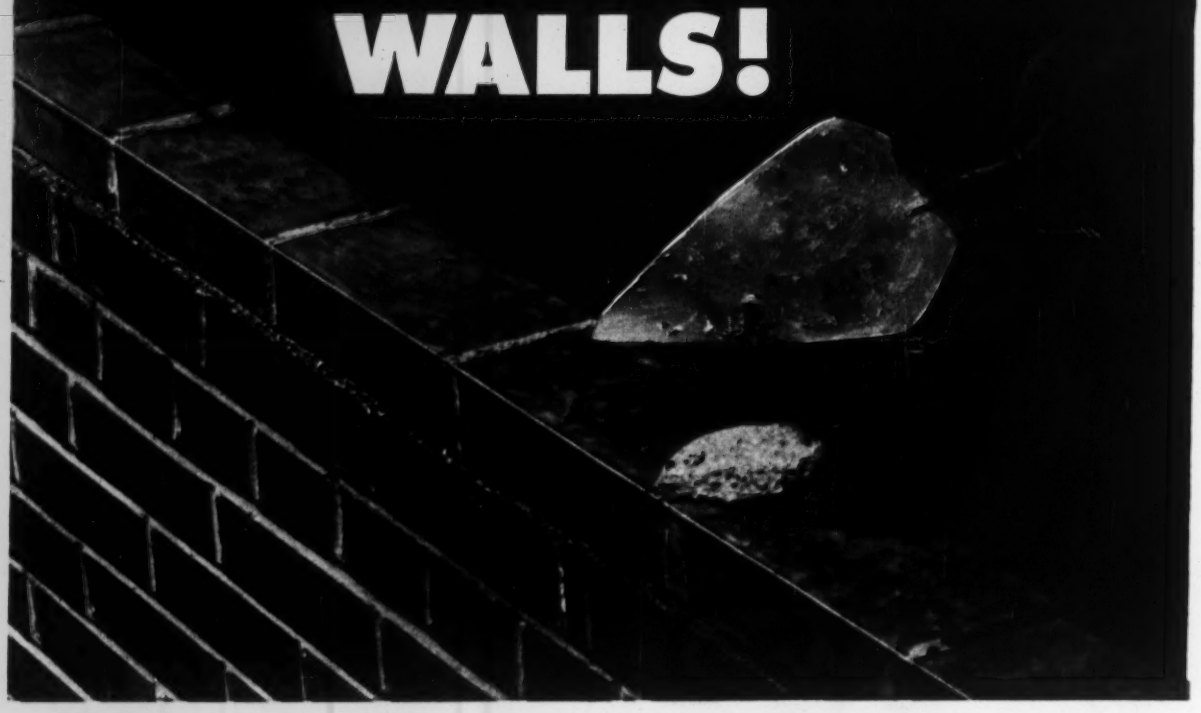
Please send the material checked:

☐ PlyGlaze Literature
☐ PlyGlaze Samples

Name .....
Firm .....
Address .....
City ..... Zone ..... State .....

*HIGH DENSITY (glossy, translucent overlay) is special concrete form panel. MEDIUM DENSITY overlay (opaque with texture similar to drawing paper) is paint grade; not for form work.

THIS KIND OF WORKMANSHIP OFTEN CAUSES LEAKY BRICK WALLS!



PARTIALLY filled head joints are one of the common causes of leaky brick walls.

Instead of throwing enough mortar on the brick to fill the joint completely, bricklayers often spot a dab of mortar only on one or both corners of the brick—and then slush the head joint after the brick is laid. This slushing is not enough to fill the joint solid. Result—water may work its way through voids in the head joint, to the inside of the wall.

Brixment's exceptional workability makes it easy for the bricklayer to use enough mortar to completely fill the joints without slushing, and still lay the brick easily and accurately to the line.

Brixment mortar has great plasticity, high water-retaining capacity and bonding quality, great resistance to freezing and thawing, and freedom from efflorescence. Because of this *combination* of advantages, Brixment is the leading masonry cement on the market.

BRIXMENT

LOUISVILLE CEMENT COMPANY, Incorporated, LOUISVILLE, KENTUCKY

1956, prices leveled off late in the year and remained stable during January and February of this year. But, a series of increases by the steel mills in the prices of "extras," plus some additional labor costs for the construction equipment manufacturers combined to bring on the March and April prices increases.

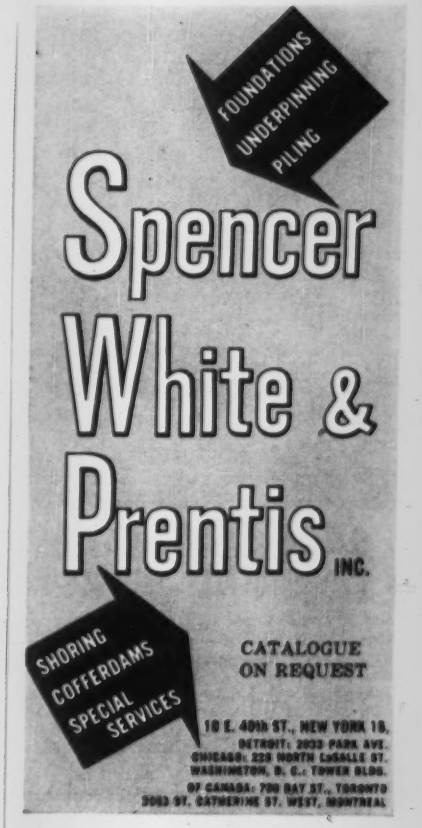
More price increases can be expected. At least one major manufacturer is forecasting a 4% to 5% rise in prices this year. One reason is that steel prices will go up again July 1 because of the automatic wage increases that will be granted to the steelworkers.

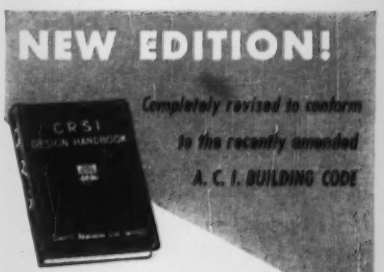
(*B&F continued on page 116*)

Construction Equipment Price Trend — April, 1957

BLS Primary Market Price Indexes, U. S. Department of Labor, 1947-49=100

	1957 Apr.	1957 Mar.	1956 Apr.	Percent Change Month	Percent Change Year
All Types of Equipment	**157.5**	**156.8**	**144.8**	**+0.4**	**+8.8**
CRANES, DRAGLINES, SHOVELS	159.3	158.0	145.7	+0.8	+9.3
Shovel, 1/2 cu yd	151.6	150.3	141.5	+0.9	+7.1
Shovel, 3/4 cu yd	162.9	160.2	149.2	+1.7	+9.2
Shovel, 1–1½ cu yd	167.9	167.9	154.1	0	+9.0
Shovel, 2 cu yd	143.7	141.3	131.3	+1.7	+9.4
Shovel, 3–3½ cu yd	154.1	154.1	139.9	0	+10.2
Shovel, 6 cu yd	173.2	170.9	153.6	+1.3	+12.8
Crane, truck mounted	162.5	161.0	153.7	+0.9	+5.7
Bucket, clam shell	152.7	152.7	134.6	0	+13.4
Bucket, dragline	180.8	180.8	160.0	0	+13.0
Crane, tractor mounted	126.6	126.6	120.3	0	+5.2
MACHINERY, TRACTOR MOUNTED	155.2	154.3	142.0	+0.6	+9.3
Dozer, cable control	149.0	149.0	146.3	0	+1.8
Dozer, hydraulic control	170.6	169.8	151.3	+0.5	+12.8
Cable, power control unit	139.9	136.6	129.8	+2.4	+7.8
Loader, shovel type	146.7	146.5	132.6	+0.1	+10.6
SPECIALIZED MACHINERY	144.6	142.5	133.8	+1.5	+8.1
Ditcher	151.8	151.8	140.8	0	+7.8
Roller, Tandem	181.7	172.8	158.3	+5.2	+14.8
Roller, 3 wheels	154.8	148.6	139.3	+4.2	+11.1
Ripper and rooter	138.1	132.8	121.8	+4.0	+13.4
Dewatering pump, 10 M gph	108.1	108.1	105.4	0	+2.6
Dewatering pump, 90 M gph	133.3	133.3	124.3	0	+7.2
PORTABLE AIR COMPRESSORS	146.2	146.2	133.2	0	+9.8
Capacity, 105–125 cfm	152.2	152.2	138.4	0	+10.0
Capacity, 210 cfm	140.5	140.5	127.7	0	+10.0
SCRAPERS AND GRADERS	150.1	148.9	138.4	+0.8	+8.5
Scraper, 4 Wheel, 8–8–.4 cu yd	155.0	145.2	132.9	+6.7	+16.6
Scraper, 4 Wheel, 14.4–15.2 cu yd	143.9	140.6	128.0	+2.3	+12.4
Scraper, 2 Wheel	113.6a	113.6a	107.0a	0	+6.2
Grader, heavy duty	154.9	154.1	143.6	+0.5	+7.9
Grader, light & medium	152.2	152.2	140.9	0	+8.0
CONTRACTORS AIR TOOLS	150.0	150.0	135.7	0	+10.5
Paving breaker	149.3	149.3	135.7	0	+10.0
MIXERS, PAVERS, SPREADERS	142.5	142.3	133.3	+0.1	+6.9
Mixer, portable, 6 cu ft	144.1	144.1	136.9	0	+5.3
Mixer, portable, 11 cu ft	151.7	151.7	145.3	0	+4.4
Mixer, portable, 16 cu ft	153.6	153.6	144.8	0	+6.1
Mixer, truck, 4½ cu yd	122.1	122.1	113.7	0	+7.4
Mixer, paving, 34 cu ft	171.8	166.8	153.7	+3.0	+11.8
Concrete finisher	166.3	166.3	158.0	0	+5.3
Bituminous distributor	115.9	115.9	108.3	0	+7.0
Bituminous spreader	160.3	160.3	137.2	0	+16.8
Bituminous paver	149.8	149.8	143.9	0	+4.1
TRACTORS	169.3	168.9	156.0	+0.2	+8.5
Wheel-type, off-highway	118.6a	118.6a	111.2a	0	+6.7
Crawler type					
30–35 dhp	166.5	165.7	156.5	+0.5	+6.4
37.0–45.1 dhp	172.3	171.9	154.7	+0.2	+11.4
60.5–75.0 dhp	176.6	174.8	158.1	+1.0	+11.7
102.0–116.0 dhp	172.3	172.3	159.6	0	+8.0
126.0–155.0 dhp	178.3	178.0	165.5	+0.2	+7.7





REINFORCED CONCRETE DESIGNS—ALL WORKED OUT!

No more algebraic formulas or calculations to make. Simply locate the table covering the member you are designing, apply span and load requirements, and then *read off directly* concrete dimensions and reinforcing steel data. Follows the latest codes and practices. Send check or money order for your copy, today.

Prepared by The Committee on Engineering Practice

OVER 450 PAGES $6.00 POSTPAID

CONCRETE REINFORCING STEEL INSTITUTE

38 S. Dearborn St., (Div. D) Chicago 3, Illinois

SAVE MANPOWER TIME AND MONEY

Use the Rbp Cross Section Reducer for cross section work, slope staking; free your expensive transit for other work. Can be operated by anyone—eliminates difficult manipulations and calculations. Reducer weighs only 8 lbs., packs with sectional rod in compact case. Sets up in a fraction of the time required by transits. Only $195, plus tax. Write for full details today. Dealer inquiries invited.

RBP. 606 Mountainview Ave. Belmont, California

Specify

AMERICAN TUBULAR TOWERS

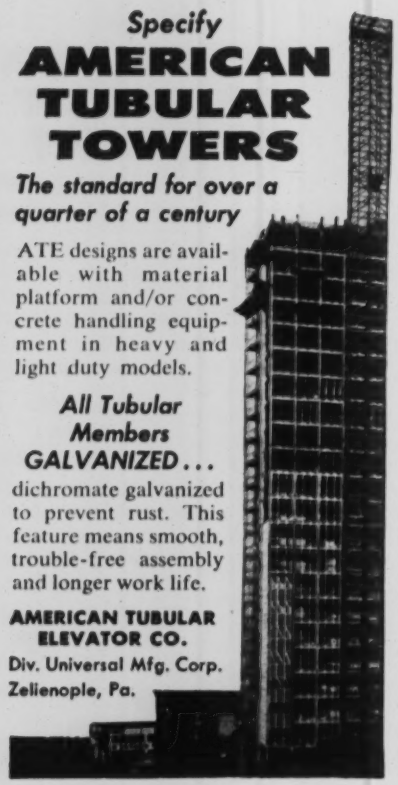
The standard for over a quarter of a century

ATE designs are available with material platform and/or concrete handling equipment in heavy and light duty models.

All Tubular Members GALVANIZED...

dichromate galvanized to prevent rust. This feature means smooth, trouble-free assembly and longer work life.

AMERICAN TUBULAR ELEVATOR CO.
Div. Universal Mfg. Corp.
Zelienople, Pa.



Construction Markets

Milwaukee: An On-the-Spot Report

Homebuilders in Milwaukee, Wis., are trying to bolster their lagging production by switching from construction of one family homes to the building of more duplex and apartment units.

Homebuilding is the one soft spot in the Milwaukee construction picture. General contractors are busy; the market is active for industrial, commercial and municipal construction.

Apart from homebuilding, 1957 construction activity in the Milwaukee area is expected to match the high 1956 rate. Commercial building may not be as great this year as it was in 1956. But this is offset somewhat by a strong upturn in modernization work performed by general contractors.

Total value of contracts to be let by Milwaukee's public works department during the current construction season is expected to reach $20 million to $22 million, according to Walter H. Tacke, deputy commissioner of public works. The 1956 figure was about $18.9 million—a record.

More contracts probably will be awarded for work on the county's expressways. With state and federal contributions included, about $26 million is available for such work this year.

Bids will be asked a second time for the city's new general cargo pier at Jones Island. The harbor commissioners received a $3.7 million bid for work on a 1,000 by 520 ft pier, as against an advance estimate of $2.7 million. The engineering firm retained by the commission now is revising plans to pare costs. Later, two transit sheds will be built under a separate contract. Construction costs for the pier and the transit sheds are expected to total $5.5 million.

The Metropolitan Sewerage Commission will expand its construction program with the help of a $5¼ million bond issue sold recently.

Plans have been sent to prospective bidders for the first unit of the $20 million Mayfair shopping center to be built in suburban Wauwatosa, west of Milwaukee.

In the utility field, approval has been received from the state public service commission for construction of a $39.5 million addition to the Oak Creek plant of the Wisconsin Electric Power Co. Rough grading already has started for that project. Initial foundation work is expected to get under way in July.

The unit will be the fifth for the Oak Creek plant. It is being constructed under the utility's 10 year, $300 million expansion program to meet the anticipated growth of industry in southeastern Wisconsin.

Business Briefs . . .

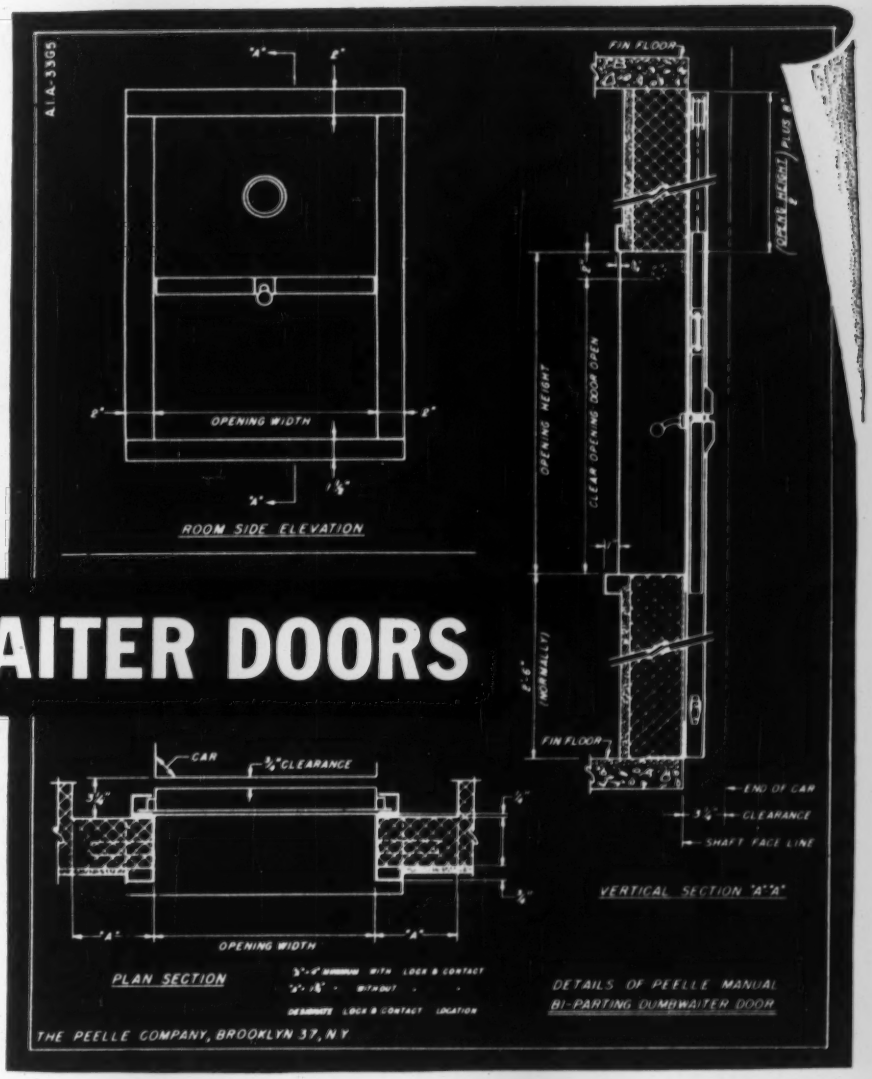
• **More steel needed**—More impressed by the high birthrate than by the slippage in the steel industry's operating rate (now about 87% of capacity), U. S. Steel's Chairman Roger M. Blough took a look into the future, told stockholders that the nation will need another 50 million tons of steelmaking capacity by 1975. Mr. Blough says there will be an increase of 10 million in the number of families in the nation by 1975, and also points to a higher per capita use of steel. In terms of expansion, U. S. Steel probably would have to add a million tons a year in capacity from now until 1975; the steel industry as a whole would boost capacity at the rate of three millions tons a year.

• **New look for public housing**—New York City's future public housing projects will be small, "vest pocket" affairs of 150 to 400 apartments sandwiched in with private housing instead of the superblock projects of 500 to 2,000 apartments built in the past, according to Samuel Ratensky, director of planning of the City Housing Authority. The new plan stems partly from the fact that large tracts of land are not readily available for the large projects, partly from a feeling that concentrating large numbers of families of the same economic level in one area is undesirable.

• **New office**—Ebasco Services, Inc., New York engineering and construction firm, has opened an office in San Francisco to serve the West Coast.

• **Turndown school plan**—The Michigan Senate Education Committee killed a bill that would have given the Detroit Board of Education authority to issue up to $100 million in school construction bonds without a popular vote. Now Detroit school officials will have to seek approval of the Common Council without voter approval. School officials want the money to build 700 classrooms in the next two years.

Specify Stainless Steel Sills for DUMBWAITER DOORS



1. To eliminate repainting costs due to scratched and worn finish on painted dumbwaiter door sills.

2. To assure permanent attractive finish providing cleanliness and preventing corrosion.

The following short specification will help you solve dumbwaiter sill problems.

SPECIFICATIONS

Furnish only, installation by others, bi-parting dumbwaiter door units as manufactured by The Peelle Company, 47 Stewart Avenue, Brooklyn 37, New York and bearing the label of the Underwriters Laboratories. Each unit shall consist of 16 gauge plain steel head, jamb, and 14 gauge stainless steel sill. Door panels of hollow metal construction filled with fireproof acoustical filler. Each upper panel shall be equipped with a 3" diameter vision panel. The top edge of the lower panel shall be constructed with stainless steel extended sill to close the space between the car platform and door panel. (Car clearance between shaft wall and dumbwaiter car to be 3¼"):

Each dumbwaiter door unit shall be equipped with either a lock and contact operated by a stationary cam, or interlock operated by a retiring cam.

Provisions will be made for mounting lock and contact or interlock on dumbwaiter door rail. All wire, wiring and mounting of lock and contact or interlock to be by dumbwaiter car manufacturer.

The assembled units, shall have one prime coat of shop paint before shipment. Finish painting by others.

The doors shall be guaranteed for one year against defects in workmanship and materials by the manufacturer.

Alternate: If complete stainless steel unit is required, frames shall consist of 16 gauge stainless steel jambs and head, and 14 gauge stainless steel sill. Room side face of panels to be 16 gauge stainless steel and shaft side plain steel.

PEELLE FOR DOORS

FREIGHT ELEVATOR DOORS • DUMBWAITER DOORS • INDUSTRIAL DOORS

THE PEELLE COMPANY 47 Stewart Avenue, Brooklyn 37, N.Y.
OFFICES IN PRINCIPAL CITIES

Engineers Say "No" to Union Ties

Minneapolis-Honeywell group rejects ESA and UAW in an election that leads to mixed interpretations

Engineers and technicians at the Minneapolis, Minn., plant of Minneapolis-Honeywell Regulator Company have rejected collective bargaining representation by either Engineers and Scientists of America or United Auto Workers (AFL-CIO).

In an election held May 8, a majority of the employees—both professional and nonprofessional—voted against joining any union. The election came at a time when trade unions are showing an increasing interest in white collar workers and when even the carpenters union is plugging "straight trade unionism" for professionals.

Robert J. Rhinehart, President of the National Society of Professional Engineers, immediately characterized the election result as "of great national significance," and said it confirms the soundness of NSPE's view that "unionism and professionalism are incompatible." ESA's President Joseph Amann, however, was inclined to attribute the results to a "powerful anti-union campaign" put on by the Honeywell company.

In the election, Honeywell professional employees were given a chance to vote independently of nonprofessional workers, and voted overwhelmingly—974 to 429—for a separate unit if either union should be certified. Their vote on union representation was 314 for UAW, 197 for ESA and 896 for no union. Technicians voted 254 for UAW, 63 for ESA, 404 for no union.

Hailing the result as a victory for professionalism, Mr. Rhinehart said: "It is our sincere hope that what happened at Minneapolis after a long and hard struggle will dispel once and for all the idea that some may still have that professional engineers of this nation will ever adopt a concept alien and antagonistic to their professional obligations and ideals."

The Honeywell election stemmed from a February attempt by the Federation of Honeywell Engineers, a 1,070 member affiliate of ESA, to disaffiliate from ESA and to join UAW. The company challenged the UAW representation and petitioned the National Labor Relations Board for a new election. ESA intervened and the final result was an election that guaranteed the professionals their Section 9 (b) (1) right to separate representation.

In commenting on the election, ESA President Amann estimated that ESA lost approximately 70% of its votes to "no union" in the last 10 days prior to the election. During this period, he said, the company "romanced" its employees, sent them letters about a "wonderful dreamland," and threw a lavish party with "free liquor, free lobster tail or steak." Nevertheless, he saw two indicators: "ESA will have to "strengthen its position," he said, to forestall "a challenge of representation" by other companies, and UAW will find organization of engineering and technical employees "a long, hard and difficult pull."

Meanwhile, the carpenters union, in the current issue of its monthly journal, asserts that "engineers belong in unions" and contends "the old idea that professionalism and unionism are incompatible is fast dying out." Pointing to the trade union success of actors, musicians, engineers, scientists and professors, it accuses professional societies of an inability "to provide their members with the advantages trade unions gain for their members day in and day out" and claims "more and more white collar workers are giving straight trade unionism a long, hard look."

More Trades Settle

Baltimore strike ends as two Chicago unions agree on five-year contracts

Settlements with six more trades broke a long construction strike in Baltimore, Md., last week as wage talks alternately eased and tightened elsewhere in the nation.

The Baltimore trades—bricklayers, iron workers, laborers, plumbers, cement finishers and sheetmetal workers—agreed to three year contracts granting package increases that range from 35 to 55 cents. Most installments are for 10 or 15 cents.

Meanwhile, in Chicago two more five year contracts appeared—one with laborers and one with cement masons. In each case there's an immediate wage increase of 20 cents and a wage reopener effective in 1959.

The week also virtually ended a month-long plumbers dispute in Miami, Fla. Individual agreements, following the pattern of a 25 cent increase over a two year period, were signed by 23 more plumbing contractors, leaving only 100 of the 900 Plumbing Industry Program members without a contract. But in Wilmington, Del., where lathers were already off the job with a request for a 55 cent wage boost over two years, the plasterers struck for a 50 cent wage increase, and in Akron, Ohio, the Construction Industry Advisory Council closed down jobs in an effort to get uniform settlements with 12 trades now negotiating. Up to that point, 11 of the trades had indicated willingness to settle for a 32½ cent, two year contract, but the plumbers had balked.

Typical of other settlements reported during the week was a one year contract between laborers and the General Contractors Association in Springfield, Ill., for a 15 cent wage boost, and a two year contract for Niagara Falls, N. Y., bricklayers, who won 46½ cents in three installments.

Secondary Boycotts

Teamster use of "hot cargo" clause is upheld

The right of a union to enforce a hot cargo clause in its labor contract has been upheld by a federal court in Washington, D. C.

In a two-to-one decision that may send the ticklish issue to the Supreme Court, the Circuit Court of Appeals this month ruled that an Oklahoma City local of the teamsters union did not violate the secondary boycott ban of the Taft-Hartley Act by urging its members not to handle freight from a company it considered unfair.

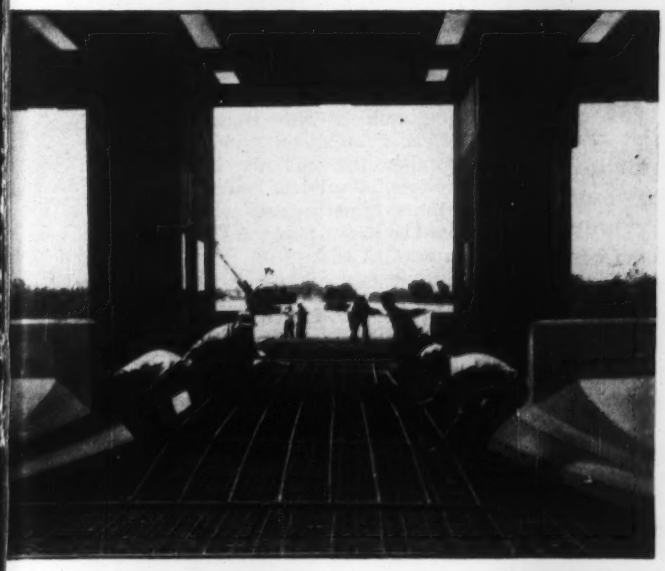
Because of the hot cargo clause in the union's contract, the court found itself unable to consider as unlawful an action which the union was legally entitled to take. The decision disagrees not only with those of the National Labor Relations Board, but with those of the Sixth and Ninth Circuit Courts of Appeals.

In the Oklahoma case, the union had urged its members not to handle freight from an employer another union was striking. The court said that this was "exactly what the carrier had agreed their employees would not be required to do".

"If an employer may lawfully agree that its employees will not be required to handle freight from a struck company", the court argued, "and such a

Just because winter's past...

let's not forget what it was like



This is a picture of an Indiana Toll Road plaza. It was taken last January, when the Country's roads and highways were coated with the slick, treacherous icing of winter. Yet, at this plaza the highway was clear and safe. Why? Because, under the pavement a snow melting system was in constant operation, keeping surface temperatures above freezing.

Over 157,000 feet of USS National Pipe was used for snow melting coils and tie-in lines in the various plaza areas of Indiana's new East-West highway—an innovation aimed at eliminating up to 90% of winter traffic hazards due to stopping and starting. It has been highly successful.

Now is the time for planning and building the snow melting systems for next winter, and the countless winters to come. And, when you make those plans, remember to include National Steel Pipe. It possesses the inherent qualities of smooth, uniform bending . . . sound, strong welding . . . and long service life—qualities that have consistently made USS National Pipe the largest selling pipe in the world.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

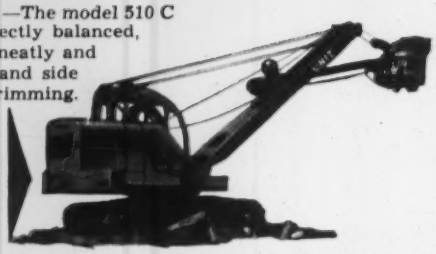
USS **NATIONAL PIPE**

UNITED STATES STEEL

Meet the UNIT Challenger

Model 510 C

AS A TRENCHOE—The model 510 C is powerful, compact, and perfectly balanced, it digs deep . . . trims corners neatly and squarely . . . cuts level floors and side walls without additional hand trimming.



AS A SHOVEL

The model 510 C performs with speed and precision. Has plenty of stability and produces maximum yardage.

ADDED to the UNIT Challenger ⅜ yard line of excavating equipment is the new UNIT 510 C. This crawler type model features: One Piece Cast Gear Case . . . Self aligning Replaceable Hook Shoes . . . Force Feed Lubrication . . . Full Floating Trunnion Mounted Tapered Drums . . . Straight-in-line Engine Mounting with Torque Converter . . . Hydraulic Actuated Clutches and Automatic Traction Brakes . . . Interchangeability of Parts that simplify maintenance and cut costs . . . plus many other advanced engineering features.

And the safety promoting FULL VISION CAB enables the operator to SEE what he is doing at all times. Get all the facts. Write for your copy of Bulletin C 900.

UNIT CRANE & SHOVEL CORPORATION

6315 W. Burnham St. • Milwaukee 19, Wis., U. S. A.

Geared to Produce Maximum Yardage

situation arises", it is hard to see how it can be said that, simply because the employees do what they have a right to do, there was a strike or refusal to work. Nor can it be said that there was a 'forcing' or requiring of an employer to cease doing business with another person, because the employer was only being compelled to live up to its own voluntary contract entered into in advance of the happening".

Hot cargo clauses generally provide that a union need not handle nonunion or struck goods. The Taft-Hartley Act prohibits a union from inducing its members to strike in an effort to make an employer cease to do business with another person. The NLRB, which has not outlawed the clauses themselves, has held that a violation of the law occurs when a union induces its members to honor the clauses. The presence of a hot cargo clause, the board holds, is not a justification of the action.

Unlike the Washington court, the Ninth Circuit in San Francisco early this year backed up the NLRB in the carpenters' Sand Door case. Carpenters on a hospital construction job had refused to handle some nonunion doors under a contract clause that said "workmen shall not be required to handle nonunion material". Holding that the refusal was illegal despite the clause, the court said that the law establishes a public policy against all secondary boycotts and that "some private agreement at odds with the statute" can't defeat that policy.

Last month, the Sixth Circuit, dealing with a carpenters' refusal to handle prehung doors on prefabricated homes being built by Erie Building Co. in Cleveland, used the same reasoning. "To allow the acquiescense of a single employer to validate conduct contrary to the express language of the statute would be to frustrate this Congressional purpose", it said.

Increased Union Activity Is Scheduled for Hawaii

The trade union movement in Hawaii gave itself a shot in the arm this month when 15 unions launched a unity program of their own. They entered into a mutual assistance pact to help each other in organizing, in bargaining and in political action.

Parties to the agreement include the AFL-CIO Building Trades Council, the Teamsters and Hotel Workers Unions and Harry Bridges' big Hawaiian unit of the International Longshoremen's and Warehousemen's Union. Avowed objectives include mainland wage scales

and working conditions and an end to open shop conditions in Honolulu.

Island construction industry has already felt the firmer muscles of labor. Plasterers have just ended a 25 day strike with an hourly wage increase of 15 cents, putting their scale at $2.75. The General Contractors Association of Hawaii, however, has already been informed that the union will seek another 10 cents in August and an additional 15 cents before the end of the year. In another strike, members of the Lathers Union have won a 15 cent increase, plus a medical plan effective in July.

The unions have warned that as a result of the pact, "any employer who picks on one of us will find that he is picking on all of us." Industries singled out for organizing aid are construction, transportation, tourist and service. The Hawaii Employers Council has denounced the pact as a threat to labor stability in the islands.

Labor Dispute Threatens Canadian Nickel Project

The International Nickel Company's $200 million Canadian nickel project in northern Manitoba faces a building trades' strike on June 1 unless a satisfactory solution is found to a union dispute with INCO over wages.

The unions threaten to declare the Mystery-Moak Lake area, where the world's second largest nickel plant will rise, as a "scab labor area." They claim that workers are being paid as low as $1.00 an hour and are working 60 to 75 hours on straight time, including Sundays and holidays. Hourly rates and working conditions equal to those prevailing in metropolitan Winnipeg are sought by the unions.

Four of the building trades unions are reportedly fining members who work on the INCO project before an agreement is reached. The unions claim that Foundation Company of Canada, general contractor on the project, is willing to sign an agreement but that INCO has refused to accept the union demands.

According to Manitoba government officials, INCO is free to pay any wages it pleases because the provincial labor laws apply only to areas with populations in excess of 2,000.

Labor Brief . . .

• **Right-to-work**—A right-to-work committee known as the Connecticut Citizens for Freedom of Employment has been formed in Connecticut with M. W. Reid of Easton as acting chairman. Object is to obtain a right-to-work law in the current legislative session.

OFFICIAL PROPOSALS

APPEAR HERE EACH THURSDAY. PROPOSAL ADVERTISEMENTS ACCEPTED UP TO 10:30 A.M. FRIDAY FOR THE ISSUE DATED THE FOLLOWING THURSDAY.

Bids: June 11, 1957

Contract BP-150.009

ADVERTISEMENT
THE PORT OF NEW YORK AUTHORITY
BROOKLYN-PORT AUTHORITY PIERS
PIER 1
DREDGING

Sealed proposals for dredging for Pier No. 1 to be constructed at the Brooklyn-Port Authority Piers will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, June 11, 1957, at which time said proposals will be opened and read in Room No. 1108.

Contract documents may be seen at the office of the Engineer of Design of the Authority, Room 1115. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman
New York, May 23, 1957

Bids: June 18, 1957

Contract BP-150.012

ADVERTISEMENT
THE PORT OF NEW YORK AUTHORITY
BROOKLYN-PORT AUTHORITY PIERS
PIER 1
FILL

Sealed proposals for placing fill for Pier 1 to be constructed at the Brooklyn-Port Authority Piers will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P. M. on Tuesday, June 18, 1957, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Design of the Authority, Room 1115. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman
New York, May 23, 1957

U. S. Government

BRIDGE CONSTRUCTION—U. S. Army Engineer District, Memphis, Corps of Engineers, P. O. Box 97, Memphis 1, Tenn. Sealed bids will be received at this office until 1:30 P.M. C.S.T., 11 June 1957, and then publicly opened, for constructing four county bridges across St. Francis River in St. Francis and Lee Counties, Arkansas. $25.00 deposit required on plans. Information on request.

Bids: June 4, 1957.

The Hydro-Electric Power Commission of Ontario

ST. LAWRENCE POWER PROJECT
SHORELINE IMPROVEMENT
VICINITY OF MORRISBURG

SEALED TENDERS, in quadruplicate, addressed to the undersigned, 620 University Avenue, Toronto 2, Ontario, and clearly marked

"TENDER FOR ST. LAWRENCE
POWER PROJECT
SHORELINE IMPOVEMENT
VICINITY OF MORRISBURG"

will be received up to 4:30 o'clock p.m., Eastern Daylight Saving Time, on

TUESDAY, JUNE 4, 1957.

The work generally consists of excavation, grading and the application of top soil and other incidental work at the area designated as future shoreline and fill area in the vicinity of Morrisburg, as specified in the Commission's tendering documents C-491-57. This work shall commence July 1, 1957, and be completed by November 30, 1957.

Copies of the tendering documents may be obtained on or after Thursday, May 9, 1957, at the office of the Director of Supply, 620 University Avenue, Toronto 2, Ontario, on payment of ten dollars ($10.00) for each set. This charge will not be refunded.

Tendering document may be inspected at the above address and at the offices of the following: the Commission's Field Office, Cornwall, Ontario; Power Authority of the State of New York, 270 Broadway, New York 7, New York; and Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts.

Each tender must be accompanied by a certified cheque drawn on a Canadian chartered bank for a sum calculated as follows:

On tenders up to $500,000, the sum shall be 10 per cent of the total amount of the tender; on tenders over $500,000, the sum shall be 10 per cent of the first $500,000 and 5 per cent of the excess over $500,000. Provisions for the return of the cheques appear in the tendering documents.

The successful tenderer may be required to furnish a performance bond in the form approved by the Commission and issued by a bonding company licensed as such in the Province of Ontario and acceptable to the Commission for one hundred per cent (100%) of the total amount of the contract. The lowest or any tender will not necessarily be accepted.

E. B. Easson
SECRETARY

Bids: May 31, 1957

Washington Suburban Sanitary Commission
Contract No. 1979-W
Furnishing and Delivering Fire Hydrants

Sealed proposals for furnishing and delivering ten (10) 4-foot; seventy-five (75) 4½-foot; seventy-five (75) 5-foot; fifty (50) 5½-foot; forty-five (45) 6-foot; twenty-five (25) 6½-foot; ten (10) 7-foot; five (5) 7½-foot and five (5) 8-foot fire hydrants with mechanical joint elbows and accessories will be received in the office of the Purchasing Agent, Room G-13, of the Washington Suburban Sanitary Commission, 4017 Hamilton Street, Hyattsville, Maryland until Friday, May 31st, 1957 at 10:30 A. M. Eastern Daylight Saving Time at which time and place they will be publicly opened and read.

Specifications may be obtained from S. Z. Salsberry, Purchasing Agent of the Commission, Hyattsville, Maryland.

T. Earle Bourne, Chairman
Frank L. Hewitt, Jr., V-Chairman
J. Norman Ager
James B. Bland
Willard A. Morris
L. S. Ray
Commissioners

Attest: John T. Bonifant
Secretary

OFFICIAL PROPOSALS

Bids: June 13, 1957

City of Springfield, Missouri Sewage Works Improvements Divisions B and K

ADVERTISEMENT FOR BIDS

The City of Springfield, Missouri, will receive sealed Proposals for the construction of additions to the Northwest Sewage Treatment Plant and modifications to the Northwest Outfall Sewers until 10:00 A.M. Central Standard Time, on the 13th day of June, 1957, at the office of the City Clerk, Springfield, Missouri.

All Proposals received will be publicly opened and read aloud in the City Council Chambers at Springfield, Missouri, beginning at 10:00 A.M. Central Standard Time, on the 13th day of June, 1957.

The Contract Documents, including plans and specifications, are on file and available for inspection at the office of the Director of Public Works of the City of Springfield at Springfield, Missouri, and at the office of Consoer, Townsend and Associates, Consulting Engineers, 360 East Grand Avenue, Chicago 11, Illinois.

Copies of Documents, including plans and specifications, required for review or bidding purposes may be obtained only from the Director of Public Works at Springfield, Missouri by depositing $50.00 for proposed Division B, and/or $15.00 for proposed Division K at the office of the Director of Public Works for each set of Documents so obtained.

The full amount of the deposit for one set of Documents and one-half of the deposit for any additional sets of Documents will be refunded to each bidder who submits a formal Proposal to the City of Springfield and who also returns the plans (and specifications on additional sets) in good condition to the Director of Public Works within ten (10) days after his bid security has been returned to him.

Equipment manufacturers, subcontractors, and others who do not submit formal Proposals to the City of Springfield will be refunded one-half (½) the amount of the deposit for all sets of complete Documents, including plans and specifications, returned in good condition to the Director of Public Works within ten (10) days after the opening of bids. No refund will be made for Documents received by the Director of Public Works after this ten (10) day period.

A certified check or bank draft, drawn on a solvent bank, payable without condition to the City of Springfield, Missouri, in an amount not less than five per cent (5%) of the bid shall be submitted with each Proposal, as a guarantee that if the Proposal is accepted by the City of Springfield, a contract will be entered into and the performance of the contract properly secured.

No bid shall be withdrawn after the opening of Proposals without the consent of the City of Springfield, Missouri, for a period of thirty (30) days after the scheduled time of closing bids. The bid securities of all bidders, except that submitted with the lowest acceptable Proposal on each Division, will be returned within ten (10) days after the time of opening bids. The bid security of the lowest acceptable Proposal on each Division may be held by the City of Springfield until a construction contract has been executed and a satisfactory Performance Bond and a satisfactory Labor and Material Bond in the sum of the full amount of his contract has been delivered to the City.

The City of Springfield reserves the right to reject any or all Proposals and to waive any informalities or irregularities in the bids received, or to accept any Proposal which is deemed most favorable to the City, at the time and under conditions stipulated in the Instructions to Bidders.

The Proposal on these Divisions shall include the furnishing of all labor, materials, equipment, tools, supplies, etc., for a complete operating installation. The work to be constructed under these Divisions is brie y described as follows:

DIVISION B—ADDITIONS TO NORTHWEST SEWAGE TREATMENT PLANT

In general, the improvement on which Proposals are requested is briefly described as follows:

The construction of additions to the existing Northwest Sewage Treatment Plant, which is of the activated sludge type. The Kraus Interchange Process will be incorporated into the enlarged plant, which will have a nominal capacity to give complete treatment to a sewage flow of 3 M.G.D. The proposed Contract includes the furnishing of all labor, materials and equipment necessary for a complete operating installation.

DIVISION K — MODIFICATIONS TO NORTHWEST OUTFALL SEWERS.

This Division includes the replacement of approximately 3150 lineal feet of existing sewers in sizes ranging from 12" to 30". The replacement sewers will be cast iron and prestressed concrete cylinder pipe and cast iron and prestressed concrete cylinder pipe in reinforced concrete cradle. In addition to the above, the placement of approximately 50 lineal feet of reinforced concrete cradle under an existing 18" cast iron pipe sewer will be required.

Plans and specifications for this project were prepared by Consoer, Townsend and Associates, Consulting Engineers, 360 East Grand Avenue, Chicago 11, Illinois.

CITY OF SPRINGFIELD, MISSOURI
W. B. Avery, City Manager

Bids: June 4, 1957

Ocean City-Longport Bridge Deck Reconstruction of South Approach Beam Spans

CAPE MAY COUNTY BRIDGE COMMISSION
CAPE MAY COURT HOUSE, NEW JERSEY
Dated: May 7, 1957

Sealed bids for the deck reconstruction of the south approach beam spans of the Ocean City-Longport Bridge will be received by the Cape May County Bridge Commission in its offices at Cape May Court House, New Jersey, until 2 P.M. Eastern Daylight Saving Time, June 4, 1957 and then at said place, publicly opened and read aloud.

The work consists generally of replacing the existing concrete deck on the thirteen 35-foot rolled beam simple spans which form part of the south approach of the Ocean City-Longport Bridge as shown on the Plans.

The Information for Bidders, Proposal, Contract, Contract Bond, Plan and Specifications may be examined at the office of the Commission, First National Bank Building, Cape May Court House, New Jersey, and at the office of Howard, Needles, Tammen & Bergendoff, Consulting Engineers, 99 Church Street, New York 7, New York.

Contract documents will be furnished for $5.00 for each set, upon application to the Commission or to the Consulting Engineers. The payment will not be refunded and contract documents are not required to be returned.

The Contract will be awarded or the proposals rejected within thirty (30) days from the date of opening proposals. The Commission reserves the right to waive any informalities in and to reject any or all bids.

Cape May County Bridge Commission
Charles B. Middleton, Chairman

Bids: June 5, 1957

Triborough Bridge and Tunnel Authority

SEALED BIDS WILL BE RECEIVED BY Triborough Bridge and Tunnel Authority at its office, Administration Building, Randall's Island, Manhattan, New York 35, N. Y., as follows:

Until 11 A.M. on Wednesday, June 5, 1957

For painting the Henry Hudson Bridge and incidental structures, Boroughs of the Bronx and Manhattan, City of New York, Contract No. HM-6.

Each bid must be accompanied by a deposit in the amount of $7,000.00.

Deposit for contract documents is $5.00, to be refunded upon return of the documents in good condition within 30 days after the opening of bids.

Contract documents and further information may be obtained at the office of the Authority.

Bids: June 4, 1957

Test Borings Contract 449

SEALED BIDS will be received by the Board of Water Supply at its offices, thirteenth floor, 120 Wall Street, New York City until 11:00 A.M. Eastern Daylight Saving Time (10:00 A.M. Eastern Standard Time) on Tuesday, June 4, 1957 for Contract 449, for drilling two vertical test borings in Upper New York Bay to determine the elevations, nature and conditions of the bed rock, and the depths and character of the overlying materials. Borings will be made from the surface of the water through the materials overlying the rock and into bed rock. Each boring shall penetrate 200 feet or more into sound bed rock as ordered but not more than 500 feet.

Pamphlets of the contract containing information for bidders, forms of bid and contract, specifications, contract drawings, requirements as to surety, etc., can be obtained in the Secretary's office, Room 1312 at the above address, upon application in person or by mail, by depositing the sum of $5.00 for each pamphlet. Within 30 days following the award of contract or rejection of bids the full amount of such deposit will be refunded for each pamphlet submitted as a bid and a refund of $4.00 will be made for each other pamphlet returned in acceptable condition.

IRVING V. A. HUIE, President, EDWARD C. MAGUIRE, HERBERT M. ROSENBERG, Commissioners; Board of Water Supply; BETTY COHEN, Acting Secretary.

U. S. Government

COMMONWEALTH OF MASSACHUSETTS. Department of Public Works. NOTICE TO CONTRACTORS: Sealed proposals for State Highway and Bridge Construction on Route 28 Relocation in the Municipalities of READING, STONEHAM and WOBURN, F. A. Project No. I-350(6) will be received at Room 427, 100 Nashua Street, Boston, Mass., until 2:00 P. M. (DST) of TUESDAY, JUNE 4, 1957, and at that place and time publicly opened and read. Proposal guaranty: $80,000. Charge for plans and proposal forms: $30.; amount returnable only to bidders. Complete information at said office; plans on display at District Office in Cambridge. Minimum wage rates for this project have been pre-determined as required by law and are set forth in the bid proposal. Minimum dump truck rates have been established. An award will not be made to a Contractor who is not equipped to undertake and complete the work. Right reserved to waive any informality in or reject any or all proposals. By: CARL A. SHERIDAN, Commissioner of Public Works. May 11, 1957.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4916), will be received at Anchorage, Alaska, until June 18, 1957, for furnishing labor and materials for relocating part of Eklutna-Palmer 115-kv Transmission Line, Eklutna Project, Alaska. Location near Palmer, Alaska. Principal items are constructing approximately 9 miles of 115-kv wood-pole transmission line; and other work. Completion time 180 days. For particulars, address Bureau of Reclamation, P. O. Pouch No. 5, Star Route, Anchorage, Alaska; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

Department of Commerce, Bureau of Public Roads, May 10, 1957. SEALED BIDS will be received at the office of the Regional Engineer, Bureau of Public Roads, 1440 Columbia Pike, Arlington, Virginia, until 11:00 a.m., D.S.T., JUNE 12, 1957, for Project 1A9. 1A10, George Washington Memorial Parkway, Arlington and Fairfax Counties, Virginia. Viaducts over Glebe Road and Pimmit Run (Abutment, Piers and Superstructures). Aggregate length: 0.167 mile. The approximate quantities of the more important items are 4,600 cu. yd. Concrete, 870,000 lb. Reinforcing Steel, and 1,250 tons Structural Steel. Minimum wage rates have been fixed as required by law. Plans, specifications and proposal forms are available upon request at the address given above. H. J. Spelman, Regional Engineer.

OFFICIAL PROPOSALS

RATE: The rate for Official Proposal Advertising is $2.10 per line (or fraction) per insertion.

COPY RECEIVED: up to 10:30 A.M. Friday for issue out following Thursday subject to space open for last minute ads.

SEND COPY: to Official Proposal Division, Engineering News-Record, P. O. Box 12, New York 36, N. Y.

OFFICIAL PROPOSALS

Bids: June 6, 1957.

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.,—Pursuant to the provisions of the Highway Law, Article 2, Title 9 of the Public Authorities Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time, on the 6th day of June 1957, by Henry A. Cohen, Director, Bureau of Contracts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 1, G. L. Nickerson, District Engineer, 333 Broadway, Albany, N. Y.						
Albany & Rensselaer	TABS 57-39E	New York State Thruway-Berkshire Section (Hudson River Bridge and Approaches)	1.44	Electrical Facilities	$10,500 Plans $15	$190,000
Saratoga (Rte. 9N)	FARC 57-67	Saratoga-Greenfield, S.H. 443 Project S-237(3)	0.58	Asph. Conc., Opt.=0.54 Mi.; Misc Work=0.04 Mi. 20′ Multiplate Arch Br.	$10,000	179,000
Saratoga (Rte. 29)	FARC 57-68	East Galway-Saratoga, Pt. 2, S.H. 5711 Project F-340(5)	0.09	Asph. Conc., Opt.=0.05 Mi.; Misc. Work=0.04 Mi. 23.1′ Multiplate Arch Br.	$4,000 Plans $10	69,000
DISTRICT No. 2, Lacy Ketchum, District Engineer, 109 No. Genesee St., Utica, N. Y.						
Herkimer (Rte. 29A)	FARC 57-74	Salisbury Center-Stratford, S.H. 464 Project F-555(8)	0.63	Asph. Conc., Opt.	$10,000 Plans $10	186,000
DISTRICT No. 3, Wm. Robinson, District Engineer, Weigh Lock Building, Syracuse, N. Y.						
Oswego	FISH 57-9	Interstate Route 5 (Brewerton-Central Square) (Oneida Lake Bridge). Project I-1118(9)	0.17	Cem. Conc. Pavt.=0.09 Mi.; Asph. Conc.=0.08 Mi. Superstructure only for Steel Arch Bridge 448′	$125,000 Plans $25	2,304,000
DISTRICT No. 4, B. F. Perry, District Engineer, Barge Canal Terminal, Rochester, N. Y.						
Livingston & Ontario (Rte. 65)	FARC 57-75	West Bloomfield-Honeoye Falls, S.H. 485; West Bloomfield-Honeoye Falls, Pt. 2, S.H. 1318. Project S-462(1)	0.16	Asph. Conc., Opt. I-Beam Bridge 97′	$8,000 Plans $10	150,000
Ontario (Rte. 14& 96)	FARC 57-71	Geneva-Lyons, Pt. 2, S.H. 5232; Phelps-Junius, Pt. 1, S.H. 5437 and West Junius-Waterloo, Pt. 1, S.H. 8056 Project F-1013(3)	1.26 (1.72 Acc.)	9″ Cem. Conc. Pavt. 2 @ 24′ Wide=1.15 Mi.; Cem. Conc. Pavt. on Ramps=1.58 Mi.; Double Surface Treatment=0.14 Mi.; Misc. Work=0.11 Mi.; Hy Sep. Comp. I-Beam 173′	$58,000 Plans $15	1,011,000
DISTRICT No. 5, E. G. H. Youngmann, District Engineer, 65 Court St., Buffalo, N. Y.						
Erie (Rte. 5)	FAC 57-6 FAC 57-7	City of Buffalo: Arterial Route and City of Lackawanna: Arterial Route (Fuhrmann Blvd.-Hamburg Turnpike Viaduct). Project U-750(11)	1.13	Viaduct Steel Superstructure	$285,000 Plans $25	5,207,000
DISTRICT No. 6, J. H. Thomas, District Engineer, 30 West Main St., Hornell, N. Y.						
Allegany (Rte. 19)	FARC 57-56	Genesee-Stannards Corners, S.H. 1849; Wellsville-Hallsport, S.H. 945. Project F-1121(1)	8.60	Asph. Conc.; Opt. Repair Exist. Truss Br.; Repair Exist. R.C. Open Box Br.	$70,000 Plans $25	1,377,000
Allegany (Rte. 70)	R.C. 57-57	Van Scoters Corners-Canaseraga-Garwoods, S.H. 1366	0.03	Asph. Conc., Ty. 1A Repairs to Existing Br.	$1,000 Plans $10	18,000
Steuben (Rte. 248)	FARC 57-62	Canisteo-Whitesville, Pt. 4, S.H. 8104 Project F-367(4)	0.65	Asph. Conc., Opt. Comp. I-Beam Br. 158′	$18,000 Plans $10	335,000
Steuben (Rte. 17)	FAC 57-5 FASH 57-11	Painted Post-West City Line of Corning, Pt. 2; Corning City: West City Line-Chestnut Street Project U-225(11)	1.79	Asph. Conc.=1.40 Mi.; Misc. Work=0.39 Mi.; Triple R.C. Box Br. 78′ Comp. Deck Girder Br. & RR Sepa. 1377.2′	$230,000 Plans $50	4,239,000
DISTRICT No. 7, R. W. Sweet, District Engineer, 444 Van Duzee St., Watertown, N. Y.						
Jefferson	FISH 57-12	Interstate Route 5, Sect. 7C-2 (Arsenal Street to New Military Road); Ramps; Parking Area, Temporary Detour, Coffeen Street and S.H. 1182 Project I-1118(13)	4.82 (2.84 Acc.)	Asph. Concrete; 4 Hy. Seps. Comp. I-Beam 219′, 205.5′, 144.3′ & 144.3′; 2 Brs. Comp. I-Beam 352′ and 352′; 2 Brs. R.C. Twin Boxes 30′ and 30′; 1 RR Sep. Comp. I-Beam 205.5′	$300,000 Plans $100	5,174,000
Jefferson & Lewis (Rte. 3)	FARC 57-69 FGRC 57-70	Fargo-Natural Bridge, S.H. 8190; Natural Bridge-Harrisville, Pts. 1, 1A & 2, S.H. 8130-5725-8213 Project F-FG-273(3)	7.30	Asph. Conc., Opt. RR Sep. Comp. I-Beam 54′ Twin R.C. Open Box Br. 32′	$108,000 Plans $50	1,969,000
DISTRICT No. 8, K. G. Rauer, District Engineer, Pleasant Valley Road, Poughkeepsie, N. Y.						
Putnam (Rte. 311)	FARC 57-76	Towners Corners-County Line, S.H. 585 Project S-477(1)	0.62	Asph. Conc., Opt.=0.60 Mi.; Misc. Work=0.02 Mi. Comp. I-Beam Br. 66′	$15,000 Plans $10	246,000
Westchester	FISWC 57-1 H.T. 57-2	New York State Thruway-Southern Westchester Connection-Sub. 11 (N.Y.C. Line-Tuckahoe Road Pts 1 & 2) and Hudson Section, Sub. 10 (Tuckahoe Road-Tarrytown). Project I-1100(2)	4.33	Lighting	$18,000 Plans $15	325,000
Westchester	FISWC 57-2	New York State Thruway-Sub. 11 Southern Westchester Connection (N.Y.C. Line-Tuckahoe Road). Project I-1100(3)	3.98	Chain Link Fence, Bit. Mac. Shoulders, Guide Rail and Misc. Work	$10,000 Plans $10	179,000
DISTRICT No. 9, J. C. Frederick, District Engineer, 71 Frederick St., Binghamton, N. Y.						
Delaware (Rte. 30)	FARC 57-65	East Branch-Downsville, S.H. 8206; Downsville Hamlet: Main St., Maple Ave. and Creamery St., S.H. 1273 Project S-464(1)	14.81	Asph. Conc., Opt.	$155,000 Plans $50	2,830,000
Delaware (Rte. 206)	FABC 57-73	Walton Village: Bridge St. and Stockton Ave., S.H. 9347 Walton-Downsville, Pt. 1, S.H. 8515. Project S-44(5)	0.74	Asph. Concrete	$9,000 Plans $10	179,000
Schoharie (Rte. 30 & 145)	FARC 57-66	Middleburg-Franklinton, Pt. 1, S.H. 1572; Schoharie-Middleburg, S.H. 5444 and Middleburg-Breakabeen, S.H. 5577. Project F-553(5)	0.17	Asph. Conc., Opt.; Comp. I-Beam Br. 348′	$30,000 Plans $10	553,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage) Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal. Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds.

Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Laws, as set forth in "Instructions to Bidders".

The right is reserved to reject any or all bids.

JOHN W. JOHNSON
SUPT. OF PUBLIC WORKS

Read the Official Proposal Columns of

ENGINEERING NEWS-RECORD

This Week and Every Week

EMPLOYMENT OPPORTUNITIES

NATIONAL COVERAGE

DISPLAYED
The advertising rate is $31.80 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.
Subject to Agency Commission.

—RATES—

UNDISPLAYED
$2.10 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.
Position Wanted ads are ½ of above rate.
Box Numbers—counts as 1 line.
Discount of 10% if full payment is made in advance for 4 consecutive insertions. Not subject to Agency Commission.

Send NEW ADS and Inquiries to Classified Advertising Division of ENGINEERING NEWS-RECORD, P. O. Box 12, N. Y. 36, N. Y.

HIGHWAY ENGINEERS

SURVEY – DESIGN – STRUCTURAL

Offices

South Bend, Ind. East Lansing, Mich. Wheeling, Ill.

Benefits

Company pays Hospital Insurance, including dependents, vacations, Profit-Sharing-Retirement Plan. Low Personnel turnover. Salary advancement periodically with your advancement in ability.

CHAS. W. COLE & SON

220 W. LaSalle Ave. South Bend, Ind.

ARCHITECTURAL ENGINEER

Architectural Engineer between ages of 25 and 35 with interest in design of industrial buildings and structures.

Excellent opportunity with consulting engineering firm in Middle West. Liberal benefit plans and good working conditions.

Send resume of education and experience with statement of salary requirements to:

P-3222, Engineering News-Record
520 No. Michigan Ave., Chicago 11, Ill.

ESTIMATOR

Excellent opportunity with rapidly expanding contractor in midwest. Specific, responsible experience in one or more of the following will be considered valuable: bridges, grade separations, concrete & asphalt paving, city widening & resurfacing projects. Salary commensurate with experience.

P-4999, Engineering News-Record
520 N. Michigan Ave., Chicago, Ill.

CONSTRUCTION ENGINEERS FOR AIR REDUCTION

AIRCO

These positions offer you opportunity to supervise construction of new plants, facilities, processes, equipment, systems, etc., are needed for our expanded chemical activities as well as to meet the growth in demand for our industrial gases. The solutions to these projects and the maintenance of Air Reduction's leadership in the future will enable you to have a rewarding, creative satisfying career while benefiting from the security that is inherent in a company so broadly diversified.

Our personnel policies offer you many advantages. A full range of benefits include a well established pension plan, group insurance and stock-investment plans, tuition plan to further your education. Salaries are open—depending on your ability and experience . . . Relocation Assistance Will Be Given

Requirements: Must be graduate engineer with not less than 5 years of field experience covering construction of buildings, utility systems, process units, heavy machinery and material handling equipment.

Apply or send resume attention Mr. W. M. Liechlek, Construction Mgr.

AIR REDUCTION COMPANY, INC.

150 East 42 St. (3d Floor) • New York 17, N. Y. • MU 2-6700

CIVIL ENGINEER

Young civil engineer interested in broad application of civil engineering.

Excellent opportunity with consulting firm. Liberal benefit plans and good working conditions. Location Middle West.

Send resume of education and experience with salary requirements to:

P-3223, Engineering News-Record
520 No. Michigan Ave., Chicago 11, Ill.

GRADUATE CIVIL ENGINEER WANTED

by City of Moline, Illinois as Assistant City Engineer for design and supervision of construction of street, water main and sewer projects. Starting salary $6,000 with vacation, sick leave and retirement benefits. Give full resume of experience and date available in first letter to

City Engineer, Moline, Illinois

ENGINEERS

Foreign Employment

MAINTENANCE, SCHEDULING & PROGRAMMING

Career opportunities for graduate engineers with minimum 6 years experience supervising maintenance engineering functions in oil refining or producing facilities, power plants, heavy industrial installations and supporting community facilities. For work in Saudi Arabia as Staff Engineers. Also opportunity for engineers with production control experience.

High salary plus living allowance and liberal all-inclusive benefits conducive to large savings. Excellent community facilities.

Write outlining background and experience. Please include telephone number.

Recruiting Supervisor, Box 215

ARABIAN AMERICAN OIL COMPANY
505 PARK AVENUE
NEW YORK 22, NEW YORK

ASSISTANT TRAFFIC ENGINEER

For Traffic Engineering Department recently established. Salary range $622 to $691 a month with maximum salary obtainable through annual and longevity increases. Registration as a professional engineer required. No residence restrictions for U. S. citizens to begin work. Wisconsin Retirement Fund and Social Security Benefits.

PERSONNEL DEPARTMENT
CITY HALL, MADISON 3, WIS.

PRESTRESSED CONCRETE ENGINEER

Unique opportunity in New England for an alert engineer to participate in a challenging construction project.

Duties involve supervising the concrete placement and post tensioning of bridge superstructure. Theoretical and practical background in prestressed concrete required.

• Salary Open •

Write: P-3106 Engineering News Record
Class. Adv. Div., P.O. Box 12, N. Y. 36, N. Y.

SUPERINTENDENT

Must be expert in Heavy Construction. Bridges, Foundations, and Coffer-dams. Permanent position with old established New Jersey Contractor on projects in New Jersey, Maryland and Eastern Penna. Minimum travel required. Reply:

P-5170, Engineering News-Record,
Class. Adv. Div., P.O. Box 12, N. Y. 36, N. Y.

SOUTH DAKOTA DEPARTMENT of HIGHWAYS

Engineering Opportunities

Professional openings on the South Dakota Department of Highways staff present permanent opportunities for Civil Engineering graduates in the following classifications and salary brackets:

Structural Designer $5940-7020

Structural Draftsman . . . $5220-6240

Civil Engineers (Highway — Survey — Design — Construction—Drafting) . . . $4980-7020

Benefits include salary schedule, sick leave with pay, paid vacations, military leave with pay, available hospitalization plan.

For application forms, contact:

C. V. DOODY, Personnel Director
Department of Highways
Pierre, South Dakota

Research and Development

Two engineers, one recent graduate, one more mature. Experience in research and development in concrete and soils desirable, particularly in highways. Permanent challenging work in Laboratory and field. Desirable facilities in suburb north of Chicago.

P-4934—Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

STRUCTURAL ENGINEERS (5 positions)

SANITARY ENGINEERS (3 positions)

$7500 - $10,000

plus

Early eligibility in generous profit-sharing plan.

Type of work:

1. Extended Program of Bridge Design Projects.
2. Design of structures for Water Treatment & Sewage disposal plants.
3. Industrial buildings.

Qualifications:

1. College degree or equivalent in Structural Engineering.
2. Minimum 5 years design experience of which minimum of 3 years should be specifically on overall layouts, design calculations, and design sketches, on type of structures listed above.

Type of work—design of

1. Water Distribution Systems and Treatment Plants.
2. Sewerage Systems and Sewage Disposal Plants.

Qualifications:

1. College degree or equivalent in Sanitary Engineering.
2. Minimum 5 years in various phases of design work on sanitary projects of which a minimum of 2 years should be on layout and design of plants.

FOR PROMPT ACTION provide:

1. Education.
2. Chronological Experience and Salary Record.
3. References—supervisors or registered engineers.
4. When available for interview at our expense.
5. When available for assignment.
6. Salary and moving allowance required to move to Augusta.

PATCHEN AND ZIMMERMAN, ENGINEERS

525 Telfair Street **Augusta, Georgia**

SUPERINTENDENT HEAVY CONSTRUCTION

Top level mature man wanted. Should have as a minimum, for the last 10 years, been continuously employed as superintendent of foundations, heavy concrete work, bridges, treatment plants, industrial construction and similar work. Permanent position, congenial working conditions and commensurate salary. Also need younger man with corresponding qualifications as assistant to our general superintendent.

E. J. ALBRECHT COMPANY
2626 W. 26th Street Chicago 8, Illinois

ENGINEERS, DESIGNERS and DRAFTSMEN

Enjoy South Florida Climate

Permanent position with established Engineering-Architectural firm

Write giving qualifications and references
to

RADER and ASSOCIATES
111 N. E. 2nd Avenue
Miami 32, Florida

CONSTRUCTION ENGINEERS

Foreign Employment

Career opportunity for graduate engineers in Saudi Arabia. Degree essential. Minimum 10 years experience supervising construction of industrial buildings, oil processing and oil handling facilities. To supervise actual construction by contract or service organization personnel involving control over construction methods, scheduling, expediting and progress; utilization of men and materials; and the inspection of workmanship for compliance with plans and specifications.

Salary commensurate with experience plus living allowance and generous all-inclusive benefits. Excellent community facilities.

Write outlining background and experience. Please include your telephone number.

Recruiting Supervisor, Box 214

ARABIAN AMERICAN OIL COMPANY
505 PARK AVENUE
NEW YORK 22, NEW YORK

STRUCTURAL and MECHANICAL DESIGNERS

Having experience with heavy material handling equipment

Permanent Position For Qualified Men

HOSPITALIZATION
INSURANCE
VACATION

Phone or Write
Chief Engineer for Interview

THE WELLMAN ENGINEERING CO.

7000 CENTRAL AVE.
Cleveland 4, Ohio
Telephone EN 1-0842

STRUCTURAL
ENGINEERS
DESIGNERS
DRAFTSMEN

Prefer several years or more experience in any of these fields:

BRIDGES

BUILDINGS
EXPRESSWAYS
HYDRO PROJECTS
TEST FACILITIES*

Will consider lesser experience with good educational background, including several recent graduates to round out a planned expansion program. Occasional openings for combination field men. These are permanent additions to our regular staffs.

We are professional engineers engaged primarily in design which covers a wide scope of practice. The variety and unusual character for example, the proposed world's largest bridge project—offer excellent opportunity for professional development and advancement.

Immediate openings in our St. Louis general offices and occasionally in our San Francisco branch office. Confidential interviews can also be obtained at Washington, D.C., and Portland, Oregon.

Paid vacation, sick leave, holiday, overtime. Excellent Employee Benefits Plan provides retirement income plus life and disability insurance. Blue Cross. Moving allowance.

Please write fully, including salary data, to

SVERDRUP & PARCEL, Inc.
ENGINEERS — ARCHITECTS
915 Olive St. Louis 1, Mo.

*We are designers of the technical facilities for the Arnold Engineering Development Center, operated by our subsidiary, ARO, Inc.

HIGHWAY ENGINEER

Highway Engineer with 8 to 12 years experience in design and administration. Must be able to assume heavy responsibility. Excellent opportunity with established consulting engineering firm in Middle West. Must be registered.

P-4635, Engineering News-Record, 520 N. Michigan Ave., Chicago 11, Ill.

McKEE
has permanent openings for
ENGINEERS
DESIGNERS
DRAFTSMEN
in the following categories:
STRUCTURAL
CONCRETE
PIPING
MECHANICAL
ELECTRICAL

BROAD diversification of work in our three engineering divisions assures you security of employment.

TELEPHONE OR WRITE TO
VICTOR HOPKINS
Arthur G. McKee & Company
2300 Chester Ave., Cleveland 1, Ohio
PHONE TOwer 1-2300
Engineering offices in
CLEVELAND, OHIO • UNION, N.J. • TORONTO, ONT.

Don't forget the
BOX NUMBER
When answering the classified advertisements in this magazine don't forget to put the box number on your envelope. It's our only means of identifying the advertisement you are answering.

REPLIES (Box No.): Address to office nearest you c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)
LOS ANGELES: 1125 W. 6th St. (17)

POSITIONS VACANT

Construction Engineer well experienced in heavy reinforced concrete work. Job in Columbia, S. A., Spanish not required, 1 yr. contract with 1 yr. option; salary plus profit sharing. Send complete resume. Applications prior to May 10 were lost, please apply again. P-5024, Engineering News-Record.

Designers - Electrical - Piping - Struct. Power Plants and Industrial Buildings. Marbarry Corp. 120 Greenwich St., New York City 6, N. Y. REctor 2-3749.

Gunite Superintendent—Wanted immediately. Middle Atlantic States. State age, experience, availability, salary desired. P-4640, Engineering News-Record.

City Engineer: Registered professional engineer desired for City of approximately 18,000. Municipal experience desired, but not mandatory. Full details of education, experience and qualifications should be furnished. Contact Mayor, Fremont, Nebraska.

Highway and Bridge Engineers, Designers, Draftsmen, and Chief of Party. Permanent positions available. (Location Southern Connecticut). Send resume of experience to: P-4969, Engineering News-Record.

POSITIONS VACANT

Estimator—for leading, established eastern Mass. highway, bridge and waterfront contractor. Extensive experience in heavy construction necessary. Resume and salary requirement to P-5071, Engineering News-Record.

Teaching—Structures, Highways, Fluid Mechanics Specialists at assistant or associate professor level. Opportunity to engage in research at Fritz Engineering Laboratory. Also openings as graduate teaching and research assistants and instructors, with opportunity for advanced degrees. Head, Dept. of Civil Engrg. Lehigh University, Bethlehem, Pa.

Engineers on water works, sewerage and sewage treatment projects. Experienced in design and plan preparation for sanitary projects or work of related type. Opportunity for permanent connection with Ohio consulting firm in long established practice. Please provide full details of experience, education, references and salary. P-5047, Engineering News-Record.

Engineers—Architects—Draftsmen. Experienced in design and supervision of construction on water works, sewers and general building construction. State experience, age, salary requirements and earliest date available. P-4813, Engineering News-Record.

Engineering Graduates with experience in the testing and control of concrete, asphalt and soils for work abroad. Give full details of experience and education. Salary range $8000.00 to $10,000.00 per year. P-5104, Engineering News-Record.

Seaway contractor requires Draftsman-Designers, Computers, Field Engineers on form checkouts, Party Chiefs and Instrument Men. Work week to consist of six (6) days. Send resumes with desired salaries. Application not considered unless desired salary is indicated. All inquires to be kept confidential. P-5083, Engineering News-Record.

Wanted—Aggressive manager for growing 25 man structural fabricating shop, midwest location. Write stating qualifications and compensation desired. P-5093, Engineering News-Record.

College Instructor—Young Engineering Graduate. Some industrial experience desirable. Opportunity to work on advanced degree. Write: Head, Department of Engineering Drawing, Iowa State College, Ames, Iowa.

Estimator-Project Manager or Assistant for building construction. Well established, growing Company in Rhode Island. Three to Five years contractor experience desirable. Good opportunity for advancement. P-4970, Engineering News-Record.

Experienced Steel Detail Checker. Must have minimum of 3 years detailing experience. Assistant to Chief Engineer. Will supervise and check work of detailers, handle job correspondence and scheduling. Will be trained to do steel estimating. Good salary, usual vacation and benefits plus profit sharing plan. Send resume and references to—Michigan Fabricating and Welding, 1950 Wellworth St., Jackson, Michigan.

Electr. and Mech. Project Engrs., Design Ltg. Power & Comm. Systems; Design Heat-Vent-Air Cond., Com'l & Ind'l Bldg. Pers. Mgr. 321 S. Beaudry, Los Angeles 17, Calif.

POSITIONS WANTED

Equipment Supt., Master Mechanic, 45 yrs. old. 26 yrs. experience in field and shop management and administration. With all types construction and equipment. PW-5011, Engineering News-Record.

Designer, Estimator or Construction Supervisor with college education, three years experience. Available at once. PW-4993, Engineering News-Record.

Dredging Engineer. All phases. Layout, design, supervision, operation, hydro-graphic surveying, inspection. Will contract for individual jobs anywhere in world. Graduate, registered, 40 years old, self-employed. Reference and record on request. John Huston, Corpus Christi, Texas. TErminal 5-7493.

Project Manager, Administrative Engineer, registered, 22 yrs. experience design, supervision and construction highways, airbases, and large plant development. Available June. Salary $10,000. PW-5037, Engineering News-Record.

Continued on page 128

ENGINEERS

Long established firm of consulting engineers with world-wide practice needs both beginners and experienced civil, electrical, mechanical, and foundation engineers for interesting work on large dams, powerplants, and river control works. Permanent positions. Liberal employee benefits. Starting salaries dependent on qualifications. Please send complete resume to Hugo Niemi, Personnel Manager.

HARZA ENGINEERING CO.

400 W. Madison St. Chicago 6, Ill.

BRIDGE & HIGHWAY ENGINEERS DRAFTSMEN

BROOKHART & TYO

Consulting Engineers

3501 N. Front St. Harrisburg, Pa.

FIELD ENGINEER WANTED

Preferably civil engineering graduate with several years field experience by large heavy construction contractor to lay out work, make simple estimates and assist superintendent. Permanent position, location Maryland. Excellent opportunity for ambitious man as several of our executives have started with us in similar positions. Please state age, education, short experience outline, and salary desired.

P-5135, Engineering News-Record,
520 N. Michigan Ave., Chicago 11, Ill.

ENGINEER
PROJECT—PROCESS DESIGN

A well-known large multi-plant processor has an excellent opportunity available in their Chicago Division for an experienced Mechanical or Chemical Engineer. Will be responsible for designing production processes, improving existing procedures and administering projects from their inception to their completion. Desire processing industry experience.

This is an old established company with an exceptional record of earnings, growth and stability. Opportunity demands man of highest professional and personal qualifications. The salary will be commensurate with these characteristics and engineering experience. Please submit resume and salary requirements to:

P-5166, Engineering News-Record,
Class. Adv. Div., P.O. Box 12, N. Y. 36, N. Y.

CHIEF ENGINEER

Permanent position with excellent future and good salary for college graduate mechanical or mining engineer, age up to 45, with several years of successful experience in the design and application of crushers and all other types of aggregate production machinery and with engineering department administrative experience. Location mid-west city with very good living conditions. Give age, complete outline of education and experience. State salary expected and enclose recent photo. Replies kept confidential.

P-5171, Engineering News-Record,
520 N. Michigan Ave., Chicago 11, Ill.

POSITIONS AVAILABLE
FOR
ENGINEERS
DESIGNERS DETAILERS

ON HIGHWAY, EXPRESSWAY AND DRAINAGE ENGINEERING DESIGN IN OUR ST. LOUIS OFFICE

YOU WILL WORK WITH HIGHLY SKILLED ENGINEERS IN A PLEASANT ENVIRONMENT

Overseas Openings Available For Engineers 30 to 45 With Extensive Experience in Highway Engineering

Write Fully To

SVERDRUP & PARCEL ENGINEERING CO.
1134 LOCUST ST., ST. LOUIS 1, MO.

Highway & Bridge Engineers Designers & Draftsmen

Career opportunities for men interested in professional recognition.
Excellent working conditions and employee benefits including liberal retirement program.
Openings in Pennsylvania, Maryland, Florida, West Virginia, Mississippi and overseas.

Air Mail Resume TO R. L. SHAW, *Personnel Director*

MICHAEL BAKER, Jr., INC.

BAKER BLDG. *Consulting Engineers* ROCHESTER, PA.

EXECUTIVE STRUCTURAL ENGINEER

Wanted by a large, heavy industry —multi-plant midwestern company —to take top responsibility for all plant improvement, new plant construction and general engineering problems—leading to position of

VICE PRESIDENT and
CHIEF ENGINEER.

Qualified applicant must have sufficient background in heavy construction—and structural and mechanical engineering fields with at least ten years of proven, successful responsibility in similar capacities.

Real opportunity — commensurate salary with unusually attractive retirement program. Give details, qualifications, last salary (confidence respected).

P-5001, Engineering News-Record,
520 N. Michigan Ave., Chicago 11, Ill.

ENGINEERS

Positions open for experienced Engineers with excellent opportunities for advancement:

CIVIL OR SANITARY ENGINEERS to design Sewage Treatment Plants and Sewage Works or to take charge of individual project.

STRUCTURAL DESIGNERS experienced in Concrete and Steel design of Sewage Treatment Plants, Water Treatment Plants, or Hydraulic Structures in connection with Dams.

SOILS ENGINEERS experienced in Slip Circle Analysis Method for design of Earth Dams or experienced in Highway Construction.

HYDRAULIC ENGINEERS experienced in design of Earth and Concrete Dams or Water Treatment Plants.

CIVIL OR SANITARY ENGINEERS as Principal Assistant in Design.

DRAFTSMEN experienced in Turnpikes, Bridges, Dams, Water Treatment and Sewage Treatment Plants.

SPECIFICATION WRITER experienced in Sewage Plant Specifications.

Ideal living conditions, vacations and sick leave, bonus, insurance and retirement benefits.

Send complete resume to —

GANNETT FLEMING CORDDRY & CARPENTER, INC.

P. O. Box 366 Harrisburg, Penna.

EMPLOYMENT OPPORTUNITIES

POSITIONS WANTED

Mechanical Engineer — Age 31 — contracts manager, project engineer—supervisor machinery and mechanical equipment installation, 8 years experience heavy construction foreign and domestic, field and office. Excellent references. Seeking opportunity N.Y.C. or vicinity metropolitan area. PW-4764, Engineering News-Record.

Chief Estimator, B.C.E., 10 yrs. heavy construction experience, excavation, utilities, paving, structures. Prepare bids, payments, subs, costs, admin. P.E. license N.Y. & N.J. Prefer N.Y., N.J. or Conn. PW-5095, Engineering News-Record.

C.E., 26, Associate, learn with small, local contractor. Field, office. Anywhere. PW-5084, Engineering News-Record.

Civil Engineer, 33, B.S.C.E., M.S.C.E., P.E. in Texas, A.M. ASCE, two years Law, some training in Accounting and Industrial Engineering. Familiar with construction contract law and administration. Cost Engineer and estimating experience. Graduate training and experience in soils and foundations. Supervisory experience in military construction involving roads, bridges, small air field, buildings. Technical articles published, good speaker. Now RA, CE officer. Desire permanent employment with future in engineering, construction, or industrial management. PW-5164, Engineering News-Record.

Reg. Ariz. P.E., 39, B.S.C.E., 8 years experience in location, design, and construction of highways and general administration. Southwest preferred. PW-5173, Engineering News-Record.

Project Engineer, NYPE, RPI 1951, Tau Beta Pi, Age 32, Field and main office for contractor with multimillion volume; layout, estimate, coordinate, supervise, claims, administrate; Industrial, Commercial, Army, Navy. Seeking position with unlimited opportunity. PW-5152, Engineering News-Record.

Civil Engineer, 29, BSCE 51. Completing military tour early Sept. 4 yrs. bldg. constr. experience with contractor—coordinating, expediting, & erection. Seeks responsible, challenging position with small contractor or consultant leading to executive capacity. Prefer location near State of Delaware. PW-5153, Engineering News-Record.

Heavy Equipment School Director and Assistant Director, thoroughly experienced in all phases of organization and operation, to train heavy equipment operators. Best references. PW-5144, Engineering News-Record.

Situation Wanted. Civil Engineer, B.Sc (Eng), 30, married, 5 years broad experience in engineering design & construction (Structural & Hyrdaulic work). Desires responsible position with progressive firm operating in South America. Fluent knowledge of Spanish. Present location Canada. PW-5155, Engineering News-Record.

Administrative - Management Engineer, 35. Reg. P.E., MCE., MS in IE. (Columbia Univ.) 13 years experience as structural designer planning and scheduling, economic feasibility and manpower studies, engineering surveys and reports. Excellent administrator. French, German, Spanish. Seeking challenging assignment U. S. or overseas. PW-4883, Engineering News-Record.

Estimator, Job Manager, 31, graduate engineer, excellent training, capable of assuming complete responsibility for estimating, bidding, buying, and managing jobs for building contractor. Interested in position with medium size general contractor offering eventual share in business as reward for faithful performance. Prefer southeast or middle atlantic states. PW-5128, Engineering News-Record.

Project Manager—20 years experience, power plants and heavy industrial work both foreign and domestic. PW-5122, Engineering News-Record.

Architect—Engineer, registered, age 40, "thinking Florida" for warmer climate desires permanent association with Architect's or Engineer's office in Florida. Resume furnished on request. PW-5112, Engineering News-Record.

Civil Engineer—Good all-round man, broad experience, South or West. PW-5113, Engineering News-Record.

Project Mgr.—Engineering Co-ordination all phases management heavy industrial projects. Mechanical, electrical, chemical process & manufacturing. Joint Venture & Labor relations, contractural experience. Foreign or domestic. PW-5114, Engineering News-Record.

SEARCHLIGHT SECTION

(Classified Advertising)

BUSINESS OPPORTUNITIES — **EQUIPMENT USED or RESALE**

UNDISPLAYED ——*RATES*—— *DISPLAYED*

$2.10 a line, minimum 3 lines. To figure advance payment count 5 average words as a line.

BOX NUMBERS count as one line additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads.

The advertising rate is $23.60 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches to a page.

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

Send NEW ADVERTISEMENTS or Inquiries to Class. Adv. Div. of Engineering News-Record, P. O. Box 12, N. Y. 36, N. Y. June 6th issue closes May 27th

REPLIES (Box No.): Address to office nearest you c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

ENGLISH MANUFACTURER WISHES AMERICAN ARTICLE TO MANUFACTURE & SELL

A. & B. MOTORS (Newton-Le-Willows) Ltd. Mill Lane, Newton-Le-Willows, Lancashire, England: Accredited Motor Dealers for British Motor Corporation: Jaguar cars, Rolls-Royce and Bentley etc., HAVE an efficient Engineering Dept—engaged in the production of repetition machined parts: The work on hand is sub-contract for numerous important establishments. The firm is desirous of taking on the manufacture of an American article from start to finish for sale in Great Britain under license. They are equipped with modern machinery with go ahead personnel having the know how to turn out a first class job. Capital available and good representation.
Bankers reference. Westminster Bank Ltd. Earlestown, Newton-Le-Willows, Lancs.
Trade reference . . . **W. Watson & Co., Ltd., Car Distributors, Bold St., Liverpool.**
Replies to:—

A. & B. MOTORS
(Newton-Le-Willows) Limited,
Mill Lane, Newton-Le-Willows,
Lancs. England.

BUSINESS OPPORTUNITY

For Sale—General Contracting Business— Midwest location. Owners desire retirement and offer a well-balanced business in the following lines. State Highway bridge and special structures prequalifications. Industrial accounts, including new structures, millwright work, and heavy maintenance. Municipal contracts, heavy sewers, power plant and disposal work. Offered as a working organization, complete with personal equipment, land and buildings. BO-5115, Engineering News-Record.

CONTRACT WORK WANTED

Bridgeway Associates. Design, contract drawings, specifications for all types of bridges including long span. Professional Engineers. CWW-4279, Engineering News-Record.

WANTED — USED HOIST

3—Drum hoist with derrick swinger. 100 hp electric drive, 12,000 lb. slp.

Contact **F. E. RISKEN.**
Tel. **Cypress 6-6002, The Dalles, Oregon**

WANTED—USED BULK CEMENT BIN

Rent or purchase approx. 400 barrel capacity complete with bulk truck unloading facilities, elevator, and weighing hopper for dry batching to trucks.

MacDONALD ENGINEERING CO.
22 West Madison St. Chicago, Ill.

FREE!

Here is one of the most complete lists of used construction equipment available anywhere. Contains all used equipment offered at State's branches. Ask for your free copy by writing Manny C. Croft at:

STATE
EQUIPMENT COMPANIES
3726 North Front Street
Harrisburg, Pennsylvania

STRUCTURAL ENGINEERING
ARCHITECTURAL ENGINEERING
WILSON *Engineering Corp.*
College House Offices HARVARD SQ. CAMBRIDGE MASS.

LEASING
HOUSE TRAILERS
Rental may apply to purchase price.
HURST PONTIAC CO.
401 N. Main St. Edwardsville, Ill.

IF there is anything you want . . .

that other readers of this paper can supply

or—something you don't want

that other readers can use, advertise it in the

SEARCHLIGHT SECTION

FOR IMMEDIATE SHIPMENT
f.o.b. MASSENA, N. Y.

2—10" to 16" H Beam Helmets
3—Sheeting Helmets for SP 6A Pile Section

WALSH, PERINI, MORRISON, KIEWIT, UTAH CO'S
P.O. Box 106, Massena, N. Y.
Phone: ROckwell 9-2456

BOOMS & FAIRLEADS
For MANITOWOC Models
2000 - 3000 & 3500
Guaranteed Same as New

ANDERSON EQUIPMENT COMPANY
P.O. Box 1737, Pittsburgh 30, Pa.
Phone: LEhigh 1-6020

FOR SALE

48B Bucyrus Erie Shovel diesel 2 cy
10,000' 9" x 9" road forms
1,550' 8" x 8" road forms*
2,500' 16" x 12" airport forms*
*Used four months only

WILLIAMS CONSTRUCTION COMPANY
Box 5045 Balto. 20, Md. Murdock 6-6600

FOR SALE OR RENT

1—2195 cu. ft. Worthington Synchronous Motor Driven Air Compressor.
1—1 yd. Lorain L-50 Backhoe and Crane.
1—25 ton Bay City Truck Crane.
1—65 ton G.E. Diesel Electric Locomotive.
1—35 ton Ohio Diesel Locomotive Crane.

B. M. WEISS COMPANY
Girard Trust Bldg. Phila., Pa.

FOR SALE
MANITOWOC LIFTCRANE
MODEL 3000B
FORSYTHE EQUIPMENT CO., INC.
37-11 Vernon Blvd.
Long Island City 1, N. Y.

PORTABLE AIR COMPRESSORS

Two model RP-600 (600 CFM capacity) Gardner Denver Rotary powered with 6-71 G. M. Diesels.

For further information, call or write B. B. Browning: Automotive Rubber Company, Inc., 12550 Beech Road, Detroit 39, Michigan. Phone KE-23000.

PUMPCRETE
FOR SALE OR RENT

Rex Model 200 Double; 1,200 ft. of pipe and accessories. Has pumped 5,000 yds. Excellent condition.

GRATTON CONSTRUCTION CO., INC.
1128 W. Front St. Monroe, Michigan

3—P&H TRUCK CRANES
20 & 25 TON 80' BOOM
30' JIB. YEAR 1950

A. P. CRANE RENTAL CO.
1230 Randall Ave. New York
Tel. DA 9-5056

"SEARCHLIGHT"
IS
Opportunity Advertising

—to help you get what you want—to help you sell what you no longer need.

Take Advantage Of It

For Every Business Want

"THINK SEARCHLIGHT FIRST"

PILE DRIVING EQUIPMENT

VULCAN AND McKIERNAN-TERRY
Steam Pile Hammers and Extractors

- DROP HAMMERS
- STEEL LEADS
- HOISTS AND BOILERS
- DRIVING CAPS
- PILE DRIVER HOSE
- STEEL SHEET PILING

CONMACO
CONTRACTORS MACHINERY COMPANY
820A KANSAS AVE., KANSAS CITY, KANS. • DRexel 1-3930

LOW COST INSTALLATION AND OPERATION

CABLEWAYS
IMMEDIATE SHIPMENT
ELECTRIC, STEAM OR DIESEL
CAPACITY 3 TO 20 TONS
SELL, RENT OR BUY
FOR DAMS BRIDGES BREAKWATERS FILTRATION AND SEWERAGE PLANTS
FOR SPEED ECONOMY EFFICIENCY FLOOD SAFETY LABOR REDUCTION
AMBURSEN DAM CO. INC.
295 MADISON AVE. NEW YORK

PUMPCRETE
Current Models Sale or Rent
Engineering Service & Parts
R. T. SHERROD
Concrete Equipment Company
Jones Island, Milwaukee 7, Wis.

RAILS-TIES
TRACK ACCESSORIES
NEW and RELAYING

FOSTER *QUALITY* — FULLY GUARANTEED
RELAYING RAILS

Handle more cars better—cost less to install and maintain. Foster stocks all Rail Sections 12# thru 175#, Switch Material and Track Accessories.

SEND FOR CATALOGS

RAILS - TRACK EQUIPMENT - PIPE - PILING
L. B. FOSTER CO.
PITTSBURGH 30 • NEW YORK 7 • CHICAGO 4
ATLANTA 8 • HOUSTON 2 • LOS ANGELES 5

FOR SALE

DRAGLINES AND CRANES

2400 Lima Dragline, 130', 5 yd.
1201 Lima Dragline, 85', 3 yd.
955 P&H Dragline, 90', 2½ yd.
K-595 Link Belt Drag, 75', 2½ yd.
3500 Manitowoc Drag, 85', 2½ yd.
903 Osgood Dragline, 70', 2 yd.
802 and 804 Lima Cranes
3000-B & 3500 Manitowoc Cranes

SHOVELS AND COMBINATIONS

88-B Bucyrus Erie 4 yd. Shovel & Drag
1055 P&H 3½ yd. Standard Shovel
1201 Lima 3½ yd. Standard Shovel
1201 Lima Comb. Shovel Crane
54-B Bucyrus Erie Dragline-Crane
51-B Bucyrus Erie Shovel-Dragline
22-B Bucyrus Erie Shovel - Crane
25 Northwest Comb. Shovel - Drag
80-D Northwest 2-½ yd. Shovel
955 Northwest Comb. Shovel - Drag
Unit 1020 ¾ yard Shovel

TRUCK CRANES, EUCLIDS, DRILLS, etc.

Bay City, Lorain, P&H, Northwest & Osgood Truck Cranes
Euclid Tructs - 27FD, 88FD, 2FD, 82FD, 36FD, 8TD, 63 TD, 59TD, 60TD, 4-FFD
600 Reich Heavy Truck Mounted Rotary Air Drills
58-BH Joy Champion Rotary Air Drill
42-T, 29-T & 27-T Well Drills
Davey Rotary Truck Air Drills
Mayhew Rotary Truck Air Drills
Portadrill Truck Mounted Air Drills
Garwood, LeTourneau, Caterpillar, Euclid & Bucyrus Erie Scrapers
Huber 3-5 ton Tandem Roller
Buffalo-Springfield 10 ton Roller
International Bulldozers
Caterpillar & Allis-Chalmers Dozers, Front End Loaders, Graders
Shovel, Drag, Crane & Backhoe Attach., Drag & Dipper Buckets for most makes and models

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton Nat'l Bank Building
Hazleton, Pa. GLadstone 5-3658

DON'T WAIT
WF-H BEAMS
PILE SECTIONS
NEW · USED · IN STOCK

8″	BP	36#
10″	BP	42#
12″	BP	53#
14″	BP	73#
14″	BP	89#
14″	BP	102#
14″	BP	117#

We are also interested in purchasing your surplus material.

We assure you our prices will be the best obtainable.

Call HY DRACHMAN
STEEL CORPORATION
52-25 2nd Street
Long Island City, N. Y.
Phone: RAvenswood 9-1262

EIMCO TRACTOR LOADER

One (1) Model 105 Eimco Tractor Loader, equipped with Cummins Diesel Engine, Allison Torque Converter and all standard equipment and accessories

Serial No. 1050197
Engine Serial No. 139265

WALSH, PERINI, MORRISON, KIEWIT, UTAH CO'S
P. O. Box 106, Massena, N. Y.
Phone: Rockwell 9-2456

Generator Set, electric, portable, gasoline driven, skid mounted, liquid cooled, direct current, 28 V, 5 KW, 900 lbs. $350.

Transformer, oil immersed, completely self protected, distribution type, single phase, 25 cycle, self cooled, type II, class A, 2400 V primary to 120-240 V secondary, 790 lbs. $140.

Generator, Ward Powerlite Plant, Model 9750, AC 115 V, 1500 W, 13 A, 60 cycle, 1 phase, 1800 RPM, Generator MAE 511, 750 lbs. $260.

MICHAEL SAMAL
25 CLEVELAND ST.
ALBANY 6, NEW YORK

CRANES
SALE OR RENTAL—25 Ton CRANES

MANITOWOC 2000B Erection Crane, Independent Boom Hoist, Manual Controls, 14″-7″ Crawlers, 30″ Treads, Extra Counterweight. Serial No. 22162. "Diesel".

BUCYRUS-ERIE 38B Erection Crane & Dragline, Independent Boom Hoist, Fairleads, 13′-6″ Crawlers, 33″ Treads, Serial No. 102742. Caterpillar D13000 Diesel Engine.

BOTH MACHINES GUARANTEED EXCELLENT CONDITION.

ANDERSON EQUIPMENT CO.
P. O. Box 1737 Pittsburgh 30, Pa.
Phone: LEhigh 1-6020

FOR RENT OR SALE

One (1) Flex-Plane Finisher, with 5 McGinniss Vibrators—New in June 1955. Serial No. Q-44. Contact

E. H. KLIEBENSTEIN CO.
Ridgefield, N. J. Phone: WHitney 3-5533.

FOR SALE

Hendrix 4-Yard Dragline Bucket
Model 29-T Bucyrus-Erie 6″ Blasthole Drill
Model 2FD Euclid 15-Ton Dump Truck
3—Model 5FD Euclid 15 Ton Dump Trucks
1953 Eimco Model 104 Loader w/D-4 Cat. Chassis
Priced to Sell

PHILLIPPI EQUIPMENT CO.
Minneapolis, Minnesota

PILING

SURPLUS NEW and USED — For Sale, Wanted or Rent

ONE 1955 INSLEY CRANE

40′ boom ½ yd. Clamshell bucket, 24″ pads
Gasoline engine
Rated to be good working order
Priced F. O. B. New Brunswick, N. J. vicinity, $7500.

FOLEY MACHINERY CO.
Route 22 Union, N. J.

We do a Nation-Wide business in
STEEL SHEET PILING

IMMEDIATE SHIPMENT

380 pcs. 60 ft Beth. DP-2—New York
292 pcs. 60 to 30 ft. Carn. M-116—Illinois
369 pcs. 60 to 50 ft. Beth.—ZP-32—Maryland
490 pcs. 42 ft. Carn. M-116—Louisiana
244 pcs. 35 ft. Carn. M116—Wisconsin
290 pcs. 35 to 15 ft. Beth. AP-3—Ohio
190 pcs. 25 ft. Beth. DP-2—Massachusetts
Other Lengths & Sections at Various Locations

PILE DRIVING EQUIPMENT

Vulcan and McKiernan-Terry
Steam Pile Hammers and Extractors
Hoists and Boilers

MISSISSIPPI VALLEY EQUIPMENT CO.
Railway Exchange Bldg.
St. Louis 1, Mo. CHestnut 1-4474

H-BEARING PILES

Immediate Shipment From Regular Warehouse Stocks at ALL FOSTER WAREHOUSES

Also Portland, Seattle, San Francisco, Buffalo

8″ - 10″ - 12″ - 14″

L.B. FOSTER Co.
PITTSBURGH 30 • NEW YORK 7 • ATLANTA 8
HOUSTON 2 • CHICAGO 4 • LOS ANGELES 5

PIPE
Surplus New & Used
FOR SALE

PILING PILE FITTINGS • PIPE
CULVERTS • VALVES & FITTINGS
SPECIALISTS IN PRE-FAB. PIPING

ALBERT PIPE SUPPLY
Berry at North 13 Sts., B'klyn, N. Y.

STEEL SHEET PILING IN SOUTH
440 pcs. CARNEGIE MP 115—20′, 25′ & 40′
872 pcs. LARSSEN II 30′ & 40′ Lengths.
STOCKS NEW ORLEANS, TAMPA, JACKSONVILLE

DIESEL DRAGLINES
1 yd. MARION 43M—55 BOOM NEW 53
¾ yd. LIMA 34—55—1 yd. BUCKETS

SEABOARD STEEL CORP.
4521 South Tamiami Trail Sarasota, Florida
Telephone Ringling 7-0461

STEEL PIPE *Available* Sizes ½" to 24"

PIPE FABRICATION
RADIANT PANELS
WELDING & BENDING
Valves & Fittings
All Schedules and Specifications

EDW. SHERMAN CORP.
116-03 Merrick Rd., Jamaica, N. Y.
Laurelton 8-6000

RENT STEEL SHEET PILING

Get the exact lengths and sections you need of all standard sections, delivered *on time*—and at Foster's usual low rental rates.

H-BEARING PILE
PIPE FOR PILING
LIGHT-WEIGHT STEEL PILING
PILE HAMMERS & EXTRACTORS

L.B. FOSTER Co.

PITTSBURGH 30 • NEW YORK 7 • CHICAGO 4
ATLANTA 8 • HOUSTON 2 • LOS ANGELES 5

STEEL SHEET PILING

400 PCS. CARNEGIE MZ32—60 FT.
600 PCS. CARNEGIE MP101—60 FT.
347 PCS. BETH. AP3—25 & 30 FT.
416 PCS. BETH. DP2—31′, 37′ & 50′
366 PCS. BETH. ZP32—25′, 36′ & 48′
213 PCS. CARNEGIE MZ27—48 FT.

PILING BOUGHT—SOLD—RENTED

15 x 24 PORTABLE CRUSHER

Model 15 A Diamond Crushing Plant, 15 x 24 Jaw Crusher, 30″ x 8′ Apron Feeder, Hopper 24″ x 26′ Conveyor, Gasoline Engine on Pneumatic Tires.

2A Cedar Rapids Crusher
24 x 16 Rolls—3′ x 8′ Screen on Wheels

R. C. STANHOPE, INC.
60 E. 42nd St. N. Y. 17, N. Y.

EST. 1904
DAVIDSON
PIPE COMPANY INC.
One Of The Largest Stocks In The East

Seamless and Welded ⅛" to 26" O.D. All wall thickness Manufactured. Specialty large sizes. Cutting — Threading — Flanging — Fittings — Valves.

Call GEdney 9-6300
50th St. & 2nd Ave., B'klyn 32, N. Y.

GLOBE PIPE & FITTING CO.

VALVES FITTINGS NEW **PIPE** USED FOR ALL PURPOSES

785 Metropolitan Ave., Brooklyn 11, N. Y.
EVergreen 7-6220

PROFESSIONAL SERVICES

Cards arranged by areas, states, cities, names

Additional cards on following pages

NEW ENGLAND

Goodkind & O'Dea

Consulting Engineers

Design and Supervision
Foundations, Structures, Highways

1214 Dixwell Ave. Hamden, Conn.
616 Bloomfield Ave., Bloomfield, N. J.
325 Spring Street, New York 7, N. Y.
6340 Capulina Ave., Morton Grove, Ill.

The Clarkeson Engineering Co., Inc.

Engineers and Consultants

Bridges and Highways, Expressways
Investigations and Reports, Supervision of Construction. Traffic and Parking Studies, Waterfront Facilities
285 Columbus Avenue, Boston 16, Mass.
1609 Conn. Ave., N.W., Wash., D. C.

Fay, Spofford & Thorndike, Inc.

Engineers

Airports, Bridges, Turnpikes
Water Supply, Sewerage and Drainage
Port and Terminal Works
Industrial Buildings

Designs Investigations
Supervision of Construction

Boston, Massachusetts

Jackson & Moreland, Inc.

Engineers and Consultants

Design and Supervision of Construction

Reports — Examinations — Appraisals

Machine Design—Technical Publications
Boston New York

Chas. T. Main, Inc.

Engineers

Design and Supervision of Construction for Industrial Plants—Electrical, Steam and Hydraulic Engineering—Investigations, Reports, and Appraisals.

Boston, Mass. Charlotte, N. C.

Metcalf & Eddy

ENGINEERS

Investigations Reports Design
Supervision of Construction and Operation
Management Valuation Laboratory
1300 Statler Building, Boston 16

Moore Survey & Mapping Corp

Engineers *Surveyors*

Aerial surveys, Ground surveys, Geodetic Control, Hydrographic surveys, Construction surveys, Tax Maps.
11 Maple Ave. Shrewsbury, Mass.

C. W. Riva Co.

Engineers

Edgar P. Snow Robert C. Barker
John F. Westman John H. Grasas

Highways, Bridges, Tunnels, Airports, Foundations, Sewerage, Water Supply.

511 Westminster St., Providence 3, R. I.

MIDDLE ATLANTIC

Airways Engineering Corp.

Airports, highways, dams, fuel storage, pipe lines, aerial topographic mapping.
1212 - 18th St., N.W.,
Washington 6, D. C.
Phone: REpublic 7-8181

Ewin Engineering Corp.

Designers of Port Facilities, Foundations, Industrial Plants, Bridges, Highways, Sewage Disposal and Municipal Projects.
1367 Connecticut Ave. N.W.
Washington, D. C.
Miami, Florida Mobile, Alabama

Green Associates, Inc.

Consulting Engineers

Civil, Mechanical, Electrical

220 E. Pleasant St., Baltimore, Md.
Pittsburgh, Pa. Boston, Mass.

Penniman & Browne, Inc.

Engineering Division

Soils Engineering—Test Borings Load Testing—Asphalt & Concrete Design—Field and Plant Control Steel Inspection—Mobile X-Ray
341 St. Paul Place, Baltimore 2, Md.

Whitman, Requardt & Associates

Engineers—Consultants

Civil—Sanitary—Structural
Mechanical—Electrical

Reports, Plans, Supervision, Appraisals
1304 St. Paul St., Baltimore 2, Md.

Maddox and Hopkins

Engineers and Surveyors

Plane and Geodetic Surveys
Topographic Maps - Photogrammetry

Highways, Utilities, Structures
8506 Dixon Ave., Silver Springs, Md.

Fort Lee Construction Co:

Engineers and Constructors

For modern, efficient, design and erection, commercial and industrial, reinforced concrete, structural steel and timber. Complete projects, from inception to completion, based on 25 years continuous successful experience.

Main office 248 Main street, Fort Lee, New Jersey. Telephone Windsor 4-7864.

Berger Associates

Consulting Engineers

Studies, Design, Supervision
Expressways — Airfields
Structures — Foundations
177 Oakwood Ave. Orange, N. J.
Baltimore, Md.

Greer Engineering Associates

SOIL MECHANICS

Foundation Designs and Analyses
Airphoto Soils and Geological Mapping
Field and Laboratory Soil Tests

98 Greenwood Ave. Montclair, N. J.

Joseph S. Ward

Consulting Soil and Foundation Engineer

Site Investigation, Laboratory Soil Testing, Foundation Analysis, Highways, Airports, Engineering Reports and Consultation.
605 Valley Rd., Upper Montclair, N. J.

Edwards, Kelcey & Beck

Consulting Engineers

Reports, Design, Supervision
Subways, Expressways, Traffic, Parking
Harbor Works, Bridges, Tunnels
Housing and Industrial Developments
Newark, New Jersey
New York Philadelphia Boston

Porter, Urquhart, McCreary & O'Brien

O. J. Porter & Co.

CONSULTING ENGINEERS

Airports — Highways — Expressways — Buildings — Bridges — Dams — Harbors — Foundations — Stabilization — Pavements
Reports, Designs & Supervision

415 Frelinghuysen Ave., Newark 5, N.J.
625 Eighth Avenue, New York 18, N.Y.
3568 W. Third St., Los Angeles 5, Cal.
1140 Howard St., San Francisco 3, Cal.
516 Ninth Street, Sacramento 14, Cal.

Boswell Engineering Co.

Founded 1925

Ridgefield Park Trenton
N. J. N. J.

Design Reports Investigations
Surveys Const. Supervision
Highways Bridges Airports

Frank E. Harley and Associates

Consulting Engineers

Design, Surveys, Plans and Construction Highways, Sewerage and Sewage Treatment, Water Supply and Purification, Municipal Problems.
Harley Bldg., 260 Godwin, Wyckoff, N. J.

B. K. Hough

Consulting Engineer
Soils & Foundation Engineering

Site investigations, soil testing, design analysis for earthworks, foundations and pavements, field inspection, engineering reports, consultation.
121 E. Seneca St., Ithaca, New York

Ammann & Whitney

Consulting Engineers

Design and Supervision of Construction of Bridges, Highways, Expressways, Buildings, Special Structures, Airport Facilities.
111 Eighth Ave., New York 11, N. Y.
734 E. Mason St., Milwaukee 2, Wisc.

Barker & Wheeler

Water Supply Utility and
Sewerage Industrial
Sewage Disposal Valuations
Power Systems Reports

New York City, 11 Park Place
Albany, N. Y., 36 State St.

Barstow, Mulligan & Vollmer

Engineers

Surveys, Design & Construction Supervision, Highways, Expressways, Parks
Movable and long-span bridges
Prestressed Structures — City Planning and Municipal Engineering
49 W. 45 St. New York 36 N. Y.

Bogert and Childs

Consulting Engineers

Clinton L. Bogert Fred S. Childs
Ivan L. Bogert Donald M. Ditmars
Robert A. Lincoln Charles A. Manganaro
William Martin

Water & Sewage Works Refuse Disposal
Drainage Flood Control
Highways & Bridges Airfields
145 E. 32nd St. New York 16, N. Y.

Bowe, Albertson & Associates

Engineers

Sewage and Water Works — Industrial Wastes — Refuse Disposal — Municipal Projects — Industrial Buildings — Reports — Plans — Specifications — Supervision of Construction and Operation — Valuations — Laboratory Service
75 West Street New York 6, New York

Brown & Blauvelt

CONSULTING ENGINEERS

Expressways, Highways, Parkways
Airports, Bridges, Dams, Water Supply

Industrial and Chemical Plants
Sewage Disposal

Preliminary Reports, Engineering Design, Construction Supervision

488 Fourth Ave., New York 16, N. Y.

Buck, Seifert and Jost

Consulting Engineers

Water Supply — Sewerage — Hydraulic Developments — Reports and Valuations.
Chemical and Biological Laboratories.
New York City, 112 E. 19th St.

Cotton, Pierce, Streander, Inc.

Associated Engineering Consultants

Water Supply, Treatment, Distribution
Sewage, Sewage Treatment
Refuse Disposal, Trade Wastes
Power Plants
Reports, Plans, Supervision

132 Nassau St., New York, N. Y.
58 Caroline Road, Gowanda, N. Y.
3718 Garfield St., Hollywood, Fla.
Colon 106, Havana, Cuba.

Ebasco Services Inc.

ENGINEERS
CONSTRUCTORS
BUSINESS CONSULTANTS

Design and Construction
Financial and Operating Consultation
Investigations and Reports
Consulting Engineering
Appraisal

Two Rector Street New York
209 S. LaSalle Street Chic. 4, Ill.
204 Southland Life Bldg. Dallas 1, Texas
611 Equitable Bldg. Portland 4, Ore.
1625 Eye Street, N.W. Wash. 4, D. C.

Hazen and Sawyer

Engineers

Water and Sewerage Works
Industrial Waste Disposal
Drainage and Flood Control
Reports, Design, Supervision of Construction and Operation
Appraisals and Rates

122 East 42nd St. 3333 Book Tower
New York 17, N. Y. Detroit 26, Mich.

Hardesty & Hanover

Consulting Engineers

Bridges
Long Spans of All Types
Movable—Lift, Bascule and Swing
Hanover Skew Bascule
Steel and Concrete Spans
Grade Crossing Eliminations

Expressways and Thruways
Other Structures
Foundations
Supervision, Reports, Appraisals

101 Park Avenue, New York 17, N. Y.

Frederic R. Harris, Inc.

CONSULTING ENGINEERS

Reports • Feasibility Studies • Evaluations • Designs • Port Development
Foundations • Highways and Bridges
Shipyards • Marine Structures • Floating Dry Docks • Graving Docks • Bulkheads • Piers • Wharves • Power Plants • Industrial Buildings

27 William Street, New York 5, N. Y.
1915 Tulane Avenue, New Orleans, La.

Howard, Needles, Tammen & Bergendoff

Consulting Engineers
Bridges, Structures, Foundations.
Express Highways
Administrative Services

1805 Grand Ave., 99 Church St.
Kansas City 8, Mo., New York 7, N. Y.

Hunting Technical Services

Natural Resources Consultants

Geological and soils surveys for engineering, irrigation, agricultural, mineral & oil projects in U.S.A. and overseas.
57 Park Ave., New York 16, N. Y.
London Baghdad Toronto
Johannesburg Sydney Caracas

King & Gavaris

CONSULTING ENGINEERS

Bridges, Highways, Toll Roads
Arterials - Foundations
Reports, Investigations, Surveys
Supervision of Construction

425 Lexington Ave. 19 Mix Ave.
New York West Haven, Conn.

Moran, Proctor Mueser & Rutledge

Consulting Engineers

Foundations for Buildings, Bridges and Dams; Tunnels, Bulkheads, Marine Structures; Soil Studies and Tests; Reports, design and supervision.

415 Madison Ave., New York 17, N. Y.
Eldorado 5-4800

Parsons, Brinckerhoff, Hall & Macdonald

ENGINEERS

Bridges, Highways, Tunnels, Airports, Subways, Harbor Works, Dams, Canals, Traffic Parking and Transportation Reports. Power, Industrial Buildings, Housing, Sewerage and Water Supply.

51 Broadway, New York 6, N. Y.

PROFESSIONAL SERVICES

Cards arranged by areas, states, cities, names

Additional cards on preceding and following pages

E. Lionel Pavlo

Consulting Engineer

Design, Supervision, Reports
Bridges, Highways, Expressways
Marine Structures, Public Works
Industrial Construction, Airports

7 E 47th St. New York 17, N. Y.

Malcolm Pirnie Engineers

Malcolm Pirnie Ernest W. Whitlock
Robert D. Mitchell Carl A. Arenander
Malcolm Pirnie, Jr.

MUNICIPAL & INDUSTRIAL

Water Supply - Water Treatment

Sewage and Waste Treatment

Drainage - Sewerage - Refuse Disposal

25 West 43rd St., New York 36, N. Y.

The Pitometer Associates

Engineers
Water Waste Surveys
Trunk Main Surveys
Water Distribution Studies
Water Measurements & Special
Hydraulic Investigations

New York, 50 Church St.

Alexander Potter Associates

Consulting Engineers

Water Works, Sewerage, Industrial Waste, Hydraulic Works, Reports, Designs, Appraisals.

50 Church St., New York, N. Y.

Clyde Potts Assoc.

Weston Gavett - Stanley N. Williams
Consulting Sanitary Engineers

Sewerage and Sewage Disposal
Water Works and Water Supply
Valuations and Appraisals

30 Church Street, New York 7

Praeger-Kavanagh

Engineers

126 East 38th St., New York 16, N. Y.

Roos and Snow

Consulting Engineers

Reports, Design and Supervision
Highways, Expressways & Structures

144 East 30 Street—New York, N. Y.
Providence, R. I.—Binghamton, N. Y.

Sanderson & Porter Engineers

Design
Construction

New York New York

Scheidenhelm, F. W.

Consulting Engineers

Hydraulic Engineering; Hydro-electric Development; Water Supply; Flood Control; Engineering Problems relating to Water Rights and Water Power Law; Appraisals. 50 Church Street, New York 7, N. Y.

Seelye Stevenson Value & Knecht *Consulting Engineers*

Richard E. Dougherty, Consultant

Airports, Highways, Bridges, Dams, Water Supply, Sanitation, Railroads, Piers, Industrial Plants, Reinforced Concrete, Steel, Industrial Waste Disposal, Foundations, Soil Studies, Real Estate Development

Civil — Mechanical — Electrical

101 Park Avenue New York 17, N. Y.

Severud-Elstad-Krueger

Consulting Engineers

Structural Design - Supervision
Reports - Buildings - Airports
Special Structures

415 Lexington Avenue
New York 17, N. Y.

Singstad & Baillie

Consulting Engineers

Ole Singstad David G. Baillie, Jr.

Tunnels, Subways, Highways
Foundations, Parking Garages

24 State St. New York 4, N. Y.

Frederick Snare Corporation

Engineers—Contractors

Harbor Works, Bridges, Power Plants, Dams, Docks and Terminals.

Difficult and Unusual Foundations A Specialty.

233 Broadway, New York City 7

Havana, Cuba Lima, Peru
Bogota, Colombia, Caracas, Venezuela

D. B. Steinman

Consulting Engineer

BRIDGES
HIGHWAYS

Design, Construction

Strengthening, Investigations.

Reports, Advisory Service

117 Liberty St., New York 6, N. Y.

Henry W. Taylor

Consulting Engineer

Water Supply, Sewerage
Refuse Disposal, Incineration
Industrial Developments

151 W. Merrick Rd., Freeport, N. Y.

Tippetts-Abbett-McCarthy-Stratton

Engineers

Ports, Harbors, Flood Control, Power Dams, Bridges, Tunnels, Highways, Subways, Airports, Traffic Foundations, Water Supply, Sewerage, Reports, Design, Supervision, Consultation.

82 West 47th Street, New York City

The J. G. White Engineering Corporation

Design — Construction
Reports — Appraisals

80 Broad Street, New York

Lev Zetlin

CONSULTING ENGINEER

Design and Supervision of Special Structures, Hangers, Auditoriums, Industrial Plants, Hospitals.

Engineering Consultations and Reports on Special Structural Problems.

1265 Broadway New York 1, N. Y.

Keis & Holroyd

Consulting Engineers
Formerly Solomon & Keis
Since 1906
Water Supply, Sewage Disposal, Garbage & Refuse Incineration, Industrial buildings.

Troy, N. Y. Ft. Lauderdale, Fla.

Frederic A. Nassaux

Consulting Engineer

Prestressed Concrete—Reinforced Conc.
Structural Steel.
Buildings, Bridges, Structures.
Precast & Prestressed Conc. Man. Plants
Design & Supervision

R. 226 Trust Bldg., Chambersburg, Pa.

Capitol Engineering Corporation

Engineers—Constructors—Management

Bridges Dams
Planning Airports
Sewage Systems Water Works
Design and Surveys Roads & Streets
Executive Offices, Dillsburg, Penna.

Robert W. Lowry, Inc.

Consulting Engineers

Robert W. Lowry M. Lepkaluk
Design, Supervision, Reports, Long Span & Movable Bridges, Expressways, Highways, Airports, Prestress Design, Stress Analysis & Strengthening

227 Pine Street, Harrisburg, Pa.
122 E. 42nd Street, N. Y., N. Y.

Gannett Fleming Corddry & Carpenter, Inc.

ENGINEERS

Dams, Water Works, Sewage, Industrial Wastes & Garbage Disposal, Highways, Bridges & Airports
Traffic & Parking — Appraisals, Investigations & Reports.

Harrisburg, Penna

Branch Offices
Pittsburgh, Pa. Philadelphia, Pa
Daytona Beach, Fla.

Modjeski and Masters

Consulting Engineers

Bridges and other Structures
Foundations
Highways and Expressways

State Street Bldg., Harrisburg, Pa.
Philadelphia - Miami - New Orleans

Aero Service Corporation

Aerial topographic maps — photo-maps for engineering projects anywhere in the world—highways, railroads, cities, power and pipe lines, mining development. Soil studies and electronic surveys of large areas; resources inventories.

210 E. Courtland Philadelphia 20

Albright & Friel Inc.

Consulting Engineers

Water, Sewage, Industrial Wastes and Incineration Problems, City Planning, Highways, Bridges and Airports, Dams, Flood Control, Industrial Buildings, Investigations, Reports, Appraisals and Rates, Laboratory.

3 Penn Center Plaza Phila. 2, Penn.

Fridy, Gauker, Truscott & Fridy, Inc. *Architects & Engineers*

Water, Sewer, Waste Disposal, Roads, Airports, Power & Lighting, Petroleum Facilities, Hospitals, Schools, Public & Industrial Buildings, Reports, Plans, Supervision, Appraisals.

1321 Arch St. Philadelphia 7, Pa.

Harris-Dechant Associates

Frederick H. Dechant
Consulting Engineer

Water Works, Industrial Wastes, Sewerage, Recovery Processes, Hydraulic Works, Natural Gas Transmission and Distribution.

123 So. Broad St., Philadelphia 9, Pa.

Justin & Courtney

Consulting Engineers

Joel B. Justin - Neville C. Courtney
Dams and Power Problems, Hydroelectric, River Basin Developments, Water Supply, Foundations

121 South Broad Street
Philadelphia 7, Pa.

The Kuljian Corporation

Engineers • Consultants • Contractors

Power Plants, Airports & Facilities, Highways, Industrial Plants, Water & Sewage Works, Pumping Stations, Flood Control, Irrigation.

1200 N. Broad St., Phila. 21, Pa.

Yule, Sticklen, Jordan & McNee

ENGINEERS

Bridges, Highways, Airports
Design, Investigations, Reports
Supervision of Construction
Civil, Structural, Mechanical & Electrical

300 South Broad St., Philadelphia 7, Pa.
23rd & Market Sts., Camp Hill, Pa.
5564 North High St., Columbus, Ohio

American Air Surveys, Inc.

TOPOGRAPHIC MAPS & AERIAL PHOTOS FOR

• Highways • Airports • Power & Pipe Lines • Railroads • Mining • All types construction • Stockpile inventories

907 Penn Ave. Pittsburgh 22, Pa.

Hunting, Larsen & Dunnells, *Engineers*

Industrial Plants — Warehouses, Office and Commercial Buildings, Steel and Reinforced Concrete. Design and Supervision. Reports.

1150 Century Bldg., Pittsburgh, Pa.

Morris Knowles Inc.

Engineers

Water Supply and Purification Sewerage and Sewage Disposal, Valuations, Laboratory, City Planning.

Pittsburgh, Pa.

Peter F. Loftus Corporation

Design and Consulting Engineers

Electrical • Mechanical • Structural
Civil • Thermodynamic • Architectural

First National Bank Building
Pittsburgh 22, Pennsylvania

Sanders & Thomas, Inc.

Consulting & Contracting Engineers

Civil Structural Sanitary
Mechanical Electrical
Reports Plans, Supervision
Construction

POTTSTOWN, PA. Reading, Pa.
Philadelphia, Pa. Washington, D. C.

Gilbert Associates, Inc.

Engineers and Consultants

Design and Supervision of Construction
Mechanical • Electrical • Structural • Sanitary • Economic Research • Chemical Laboratory

New York•Reading, Pa.•Washington

Michael Baker, Jr., Inc.

Consulting Engineers, Civil Engineers, Planners & Surveyors; Airports & Highway Design; Water Works & Sewerage Design & Operation; Aerial Topo Maps; Surveys; Reports & Investigations; Irrigation. Home Off.—Rochester, Pa. Br. Off.: Jackson, Miss.; Harrisburg, Pa.; College Park, Md.

Sprague & Henwood, Inc.

Drilling Services

Foundation Investigations; Soil Testing & Test Borings; Grout Hole Drilling & Pressure Grouting, Diamond Core Drilling

Main Office
221 W. Olive Street, Scranton, Pa.

Branches:
1009 Western Savings Fund Bldg., Philadelphia, Pa.
11 W. 42nd St., New York, New York
200 Magee Bldg., Pittsburgh, Pa.
1248 Church St., Decatur, Ga.
Box 645—Grand Junction, Colorado
Buchans, Newfoundland

Frank D. McEnteer

Consulting Engineer

Bridges, Highways, Airports, Industrial Plants. Design, Surveys, Investigations.

504 Baltimore Ave., Clarksburg, W. Va.

SOUTH

Harry Hendon and Associates

ENGINEERS

(*Formerly Polk, Powell and Hendon*)
Harry H. Hendon L. E. Hoffmann
A. B. Jowers
Civil Engineers—Public Utilities

10 Office Park Circle, Mountain Brook
Birmingham 9, Alabama

Palmer and Baker Engineers, Inc.

Consulting Engineers - Architects

Surveys-Reports-Design-Supervision Consultation

Transportation and Traffic Problems
Tunnels-Bridges-Highways-Airports
Industrial Buildings
Waterfront and Harbor Structures
Graving and Floating Dry Docks
Complete Soils, Materials and Chemical Laboratories

Mobile, Ala. New Orleans, La.
Washington, D. C.

CONSULTANTS!

This section provides you with a dignified, ethical means of presenting your specialised services to key men in engineering.

PROFESSIONAL SERVICES

Cards arranged by areas, states, cities, names — Additional cards on preceding and following pages

Rader and Associates

Engineers - Architects

Sewage Disposal, Water Works, Ports, Airports, Bridges, Highways, Office and Commercial Buildings Industrial Plants Reports Investigations Consultations.

111 N.E. 2nd Ave. Miami 32 Florida

Duval Engineering & Contracting Co.

General Contractors

FOUNDATION BORINGS
For Engineers and Architects.

Jacksonville — Florida

Law-Barrow-Agee Laboratories, Inc.

Soils Engineers & Consultants

Soil Testing — Soil Boring — Rock Drilling—Load Testing—Field Control —Engineering Studies—Chemical Analysis—Physical Testing

Box 1558 Atlanta 1 Ga.
Serving the entire South

Patchen and Zimmerman Engineers

Bridges, Expressways, Dams, Hydro and Steam Power, Chemical, Process and Industrial Plants, Water Supply and Sewage Treatment, Investigations, Reports, Design, Supervision.

Augusta, Georgia — Atlanta, Georgia

Engineers Testing Laboratory, Inc.

Soil Mechanics and Foundation Engineering

Soil Borings — Laboratory Tests
Foundation Analyses — Reports

2116 Canada Dry St. Houston 23, Texas
444 North 9th St. Baton Rouge, La.

Eustis Engineering Company

FOUNDATION AND SOIL MECHANICS INVESTIGATIONS

Soil Borings — *Laboratory Test*
Foundation Analyses — *Reports*

3635 Airline Highway
Metairie, Louisiana

Southern Mapping & Engineering Company

Planners and Surveyors:
Airports, Highway, Water, Sewage, Topography, Reports, Investigations, Pipe Line Surveys, Acquisition of Right-of-way.

216 Commerce Pl., Greensboro, N. C.

Schmidt Engineering Co.

Consulting Engineer

Investigations, Reports, Designs, Supervision Heavy Construction—Dams and Hydroelectric Projects—Foundation Explorations and Treatment—Water and Sewerage Works—Bridges & Highways

817 Broad St. — Chattanooga 2, Tenn.

MIDDLE WEST

Alvord, Burdick & Howson

CONSULTING ENGINEERS

Water Works	Sewerage
Water Purification	Sewage Treatment
Flood Relief	Power Generation
Drainage	Appraisals

20 North Wacker Drive, Chicago

Consoer, Townsend & Associates

Water Supply, Sewerage, Flood Control & Drainage, Bridges, Express Highways, Paving, Power Plants, Appraisals, Reports, Traffic Studies, Airports, Gas & Electric Transmission Lines.

360 East Grand Ave., Chicago 11, Ill.

THIS SECTION is available to consulting engineers to contact prospective clients every week or every other week.

A. J. Boynton & Co.

ENGINEERS

Fixed and Movable Bridges
Structures
Foundations
Design
Construction

111 N. Wabash Ave., Chicago 2.

Ralph H. Burke, Inc.

CONSULTING ENGINEERS

Complete Architectural and Engineering Services
Plans, Supervision, and Reports

Expressways - Grade Separations
Traffic Studies - Parking Structures
Underground Garages - Shore Protection
Parks - Field Houses - Municipal Works
Airports and Air Terminal Buildings

20 North Wacker Drive, Chicago 6, Ill.

De Leuw, Cather & Company

CONSULTING ENGINEERS

Public Transit	Subways
Traffic & Parking	Railroad Facilities
Expressways	Industrial Plants
Grade Separations	Municipal Works
Urban Renewal	Port Development

150 North Wacker Drive, Chicago 6
San Francisco Toronto Oklahoma City

Greeley and Hansen

Engineers

Water Supply, Water Purification
Sewerage, Sewage Treatment
Flood Control, Drainage, Refuse Disposal

220 S. State Stret, Chicago 4

Harza Engineering Co.

Consulting Engineers

Calvin V. Davis — E. Montford Fuelk — Richard D. Harza
Hydroelectric Plants & Dams
Transmission Lines
Flood Control, Irrigation
River Basin Development

400 West Madison Street — Chicago 6

Hazelet & Erdal

CONSULTING ENGINEERS

Fixed Bridges, Movable Bridges, Industrial Plants, Expressways, Airports, Dams

Monadnock Block, Chicago 4, Ill.
Dixie Terminal Bldg., Cincinnati 2, O.
Commerce Bldg., Louisville 2, Ky.

Pioneer Service & Engineering Co.

Consulting and Design Engineers
Operations - - - Purchasing
Steam - - Hydraulic - - Gas
Public Utilities - - Industrials

231 So. La Salle St. — Chicago 4

Sargent & Lundy

ENGINEERS

Steam and Electric Plants
Utilities—Industrials
Studies—Reports—Design
Supervision

Chicago

Mobile Drilling & Engineering Inc.

Foundation Engineering & Testing Division—Contract Drilling Division

Foundation Investigation, Analysis & Design—Earth Dam & Embankment Design—Pavement Design—Compaction Control—Soil Sampling & Testing—Core Drilling.

960 N. Penn. Ave., Indianapolis 4, Ind.

Chas. W. Cole & Son

Engineers - Architects

Sewerage, Water Supply, Bridges, Highways, Toll Roads, Industrial, Municipal and Commercial Buildings

230 W. LaSalle Ave., Central 4-0127
South Bend, Indiana

Westville Engineering Company, Inc.

ENGINEERS AND GEOLOGISTS

Foundation Test Bornings, Soil Sampling, Rock Coring, Engineering Geology Surveys—Soil Mechanics, Concrete and Bituminous Laboratory—Field Surveys of Construction Materials—Consultants on Arbitration Matters Concerning Soil Mechanics, Concrete and Bituminous Technology

Francisco J. Cordova, P.E.
President and Chief Engineer

P. O. Box 67 — Westville, Indiana

The Austin Company

Design and Construction
Manufacturing and Process Plants
Newspaper and Broadcasting Bldgs.
Power Plants—Industrial & Institutional
Industrial Office Buildings and Laboratories
Merchandising Bldgs. & Facilities
Plant Location Surveys

New York — CLEVELAND — Los Angeles
Chicago — Houston — Oakland
Detroit — Seattle

Havens and Emerson

W. L. Havens — A. A. Burger
J. W. Avery — H. H. Moseley
F. S. Palocsay — E. S. Ordway
F. C. Tolles, Consultant

Water, Sewerage, Garbage, Industrial Wastes, Valuations—Laboratories

Leader Bldg. — Woolworth Bldg.
Cleveland 14 — New York 7

The Osborn Engineering Co.

DESIGNING-CONSULTING

Industrial Plants		Office Buildings
Stadiums	Grand Stands	Field Houses
Bridges	Garages	Laboratories

7016 Euclid Ave. — Cleveland 3, Ohio

Jones, Henry & Williams

Consulting Sanitary Engineers

Water Works, Sewerage & Treatment
Waste Disposal
Security Building — Toledo 4, Ohio

Toledo Testing Laboratory

Engineers—Chemists

Concrete—Soils—Asphalt
Inspection — Research
Tests — Development
Foundation Investigation
Borings—Diamond Drilling
Load Tests
Soils Mechanics Laboratory

1810 North 13th St. — Toledo 2, Ohio

WEST OF MISSISSIPPI

Heron Engineering Co.

Consulting Engineers

For all types of Aerial Tramways, Cableways, and Suspended Structures

2900 South Acoma St.
Denver 19, Colorado

THE GEOPHOTO GROUP

Airphoto Interpretation Specialists

Soils and Engineering Geology, Petroleum, Mining, Hydrology, Site Selection, all types Natural Resources evaluations. World-wide activities.

E. & C. Bldg. — Examiner Bldg.
Denver, Colorado — Calgary, Alta.

Stanley Engineering Company

Consulting Engineers

Hershey Building — 208 S. LaSalle St.
Muscatine Ia. — Chicago 4, Ill.

Black & Veatch

Consulting Engineers

Water - Sewage - Electricity - Industry Reports, Design, Supervision of Construction, Investigations, Valuation and Rates.

1500 Meadow Lake Parkway
Kansas City 14, Missouri

Burns & McDonnell

Engineers—Architects—Consultants

Kansas City, Missouri — Phone
P. O. Box 7088 — DElmar 3-4375

Harrington & Cortelyou

Consulting Engineers

Frank M. Cortelyou
E. M. Newman — F. M. Cortelyou, Jr.

Movable and Fixed Bridges of All Types, Foundation, and Related Structures.

1004 Baltimore — Kansas City 5, Mo.

Russell and Axon

Consulting Engineers

Civil — Sanitary — Structural
Industrial — Electrical
Rate Investigations

408 Olive St. — St. Louis 2, Mo.
Municipal Airport, Daytona Beach, Fla.

Sverdrup & Parcel, Inc.

Engineers—Architects

Bridges, Structures and Reports, Industrial and Power Plant Engineering

915 Olive St., St. Louis 1, Mo.
417 Montgomery St., San Francisco, Calif.

Benham Engineering Company

Established in 1909
Design and Consulting Engineers

215 N E 23rd Street
Oklahoma City 5, Oklahoma

Lockwood, Andrews & Newnam

Consulting Engineers

Navigation Facilities — Public Works
Airports — Earthworks — Roads
Structural, Mechanical — Electrical
Reports — Design — Supervision
Surveys — Valuations

Corpus Christi — Houston — Victoria, Texas

McClelland Engineers, Inc.

Soil & Foundation Consultants

Investigations—Reports—Supervision
Borings & Tests

2849 N. Main — Houston 9, Tex.

National Soil Services

Consulting Engineers

Soils, Foundations, Ground-water
Ralph F. Reuss — Ray E. Hurst
Soil Borings — Laboratory Tests
Foundation Analyses and Reports
Groundwater Exploration and Evaluation

4002 Gulf — Houston, Texas

FAR WEST

International Engineering Company, Inc.

ENGINEERS

Investigations - Reports - Design
Procurement - Field Engineering
Domestic and Foreign

74 New Montgomery St.
San Francisco 5, California

Consult these Specialists:

Let them save your time by bringing their broad experience in their specialty to bear on your problems.

PROFESSIONAL SERVICES

Cards arranged by areas, states, cities, names

Additional cards on preceding pages

CANADA

T. O. Lazarides, Lount and Partners

Consulting Engineers
Reports—Design—Construction Supervision Structures and Foundations
Special Analyses
Grids, shells, domes, complex design problems, bridges
269 Davenport Rd., Toronto, Canada

FOREIGN

Saenz-Cancio-Martin,

Ingenieros
Design and Supervision
Structural, Topographic, Soils and Hydraulic Engineering.
Ave. de la Independencia 174
Ensanche del Vedado Habana, Cuba

The Foundation Engineering Company of Puerto Rico

Consulting Engineers
Foundation and Soil Mechanics Investigations, Laboratory analyses, reports and recommendations, design of structures, supervision.
P. O. Box 821, San Juan, Puerto Rico

INSPECTION & TEST

A. W. Williams Inspection Co.

Established 1931—Member A.C.I.L.
Inspection — Testing — Analyses — Supervision. Foundation Investigations, Soil Borings, Soil Mechanics, Concrete and Asphalt Design and Control, Radiography, Sampling, Calibrations, Timber and timber treatment inspections. Complete testing laboratory service.
Main Office: 208 Virginia St., Mobile, Ala.

Richardson X-Ray Service

a corporation
Field X-ray, Gamma ray Inspection of Penstocks, Pipelines and related welded structures.
World Wide Service
617 S. Raymond Ave. Alhambra, Calif. Cu 3-1167

The Consulting Engineer

By reason of special training, wide experience and tested ability, coupled with professional integrity, the consulting engineer brings to his client detached engineering and economic advice that rises above local limitations and encompasses the availability of all modern developments in the fields where he practices as an expert.

The Haller Testing Laboratories, Inc.

140 Cedar St., N. Y. 6, N. Y.

Testing and Inspection of Construction Materials for: Expressways—Airports Structures—Bridges

Complete Soils Laboratory

Test Borings—Load Tests

New York, N. Y. Boston, Mass.
Plainfield, N. J. New Haven, Conn.

Robert W. Hunt Company

Inspection and Testing of Engineering Materials & Equipment

New York • Chicago • San Francisco and other Principal Cities

CHECK this section whenever you need professional advice.

Johnson Soils Engineering Laboratory

Foundation Design - Highway & Airport Pavements - Construction Control - Load Tests - Shear & Consolidation Tests - MOBILE LABORATORIES
193 West Shore Ave., Bogata, N. J.
Bogata-Hubbard 7-4408

Pittsburgh Testing Laboratory

A national service with complete laboratory and inspection facilities.
Laboratories in principal cities.
Main Office: 1330 Locust St., Pittsburgh, Pa.

SURVEYORS

James L. Bell & Company

Surveyors
Surveying Crews Available For Any Location—Contract Or Per Diem Basis

KANSAS CITY 9425 W. 75th Overland Park, Kansas
DENVER 1917 Broadway Denver 2, Colorado

When you need a SPECIALIST in a hurry . . .
Engineering News-Record's Professional Service Section offers the quickest, most direct method of contacting consultants who may be available NOW.

SEARCHLIGHT SECTION

(Continued from page 130)

Slightly Used
80D Northwest Double Stick Shovel Attachment
Excellent Condition
HODGE & HAMMOND, INC.
720 Garrison Ave., New York 59, N. Y.
Phone—Kilpatrick 2-2400

MOBILE TRENCHING MACHINES

Ditching 6" to 16" wide to depths of 4' on many occasions can be accomplished at lower than usual costs. Our Go-For-Digger, which digs off to one side, is as mobile as a pick-up truck. We generally have good rebuilt Jeep-A-Trench machines.

BARBER GREEN 705 RUN A BOUT
Excellent condition $3500.00

JEEP-A-TRENCH ATTACHMENT with new chain cutters installed on your Jeep as low as $1850.00.

Write—A. J. PARSONS, Box 11, Washington, Pennsylvania
Phone—BAldwin 5-0350

PARSONS TRENCHER
MODEL 25
890 Hours Use

In good condition, ready to run. Is powered by "Cat" D-4600 engine. Has 30" buckets with side cutters to 36" trench width. Trench depth to 8 feet. Boom extension to 13 feet.

AUGUSTA WATER DISTRICT
Augusta, Maine

FOR SALE
STEEL FRAME

Complete, unerected new steel frame, located in Pine Grove, Pa. for a 120' x 420' one story building (50,400 sq. ft.) with continuous 9-5 high steel windows. 5'-2' high bomber siding from window head to roof eave, 7 pairs steel double doors, 20 ga. 1x1½ x 6" steel trusen roof deck. Steel bays are 20' x 40' with 18'-0" clear inside weight.

For full specifications, write:
GARDEN STATE TANNING, Inc.
Pine Grove, Pa.

FOR SALE

Three Buda Diesel Generators Model 8DCSG-1125, powered by Buda Lanova Diesel Engine, Generator Century Model ARC586-W, 60 cycle, 3 phase, 125 KVA, 220/127 volts, 328 amps., complete with switchboard equipment including synchronizing equipment. All in good condition. To be sold as a unit.

Also, one Fuller-Kinyon cement unloader type C225. This equipment may be inspected at our yard, Dayton, Ohio.

MAXON CONSTRUCTION COMPANY, INC.
2600 Far Hills Avenue, Dayton 9, Ohio

RB SUBGRADER
20-24' Excellent Condition. Completely overhauled engine, including Cross-over Bridge. $3,000.00
SOUTHERN STATES EQUIPMENT CO. INC.
425 Celeste St. — New Orleans, La.
Phone—RAymond 8577

FOR SALE
NEW WAGON DRILLS
2 New Model G-300 C. P. with Cp-70 NDC Drifters and Model AW-80 Air Winches
METROPOLITAN EQUIPMENT & SERVICE CO.
169 Bedford Street Lexington, 73, Mass.
Volunteer—VO 2-2485

POWER UNIT, DIESEL, 300 HP
One (1) New General Motors, type 6-110, Model 6240SRA Short Base Open Power Unit complete with muffler, starter, etc., but without battery. Direct connected to a Cotta Model GR12E Reduction Gear 2.20:1 with a 14" two plate clutch.
Walsh, Perini, Morrison, Kiewit, Utah Co's
P. O. Box 106, Massena, N. Y.
Phone: Rockwell 9-2456

Plymouth 25-ton gas locomotive. Others.
Lima 120t diesel 3½ yd. crane-shovel-drgl.
Johnson, Noble concrete batching plants (2)
Wiley steam barge cranes, 45-65 tons (2)
Bucyrus 4½' and 16' Gold placer dredges, abroad.
Draglines, shovels, cranes, 1½ to 12 yds. (7)
Koehring 6-yd. Dumptors. Euclid rock trucks.
Colby hammerhead crane, 15 ton, 300' span.
H. Y. SMITH CO.
828 N. Broadway Milwaukee 2, Wisc.

PORTABLE GENERATORS
FOR SALE
Onan 50 KW, 3-Ph, 440 V, 60 cycle. International gas engine on skids, automatic controls, low hrs, 1954 factory built. $2300.00 f.o.b. Alpena.
Delco 25 KVA, 3-Ph, 440 V, 60 cycle, 4-cyl. International portable power unit, Rockford clutch. Good condition. $600.00 f.o.b. Alpena.
WILTSE BROS CORP.
BOX 32, ALPENA, MICHIGAN Phone 45-F-2

ADVERTISERS IN THIS ISSUE

Aero Service Corp. 97
Allison Engine Div., G. M. C. 59
American Hoist & Derrick Co. 17
American Marietta 14
Automotive & Aircraft Div. 88

Barber-Greene Co. 12
Bayley Co., The Wm. 57
Bethlehem Steel Co. 1, 76
Bituminous Coal Institute 85
Briggs & Stratton 20
Bruning Co., Inc., Charles 67-70
Buck Equip. 86
Buda Div. Allis-Chalmers Mfg. Co. 92

Case Foundation Co. 104
Cast Iron Pipe Research Assoc. 6, 7
Caterpillar Tractor Co. 107
Chicago Bridge & Iron Co. ..... 2nd Cover
Clow & Sons, James B. 9
Concrete Reinforcing Steel Institute 115

Dietz Co., R. E. 13
Dorr Oliver, Inc. 72
Douglas Fir Plywood Assn. 78, 79, 81
Dur-O-Wal 105

Eastern Constructors 135

Foster Co., L. B. 2
Fruehauf Trailer Co. 4, 5

Griffin Wellpoint Corp. 102

Haloid 98
Hough Co., Frank G. ..... 3rd Cover

Illinois State Toll 102
Ingersoll Rand Co. 15
Iowa Mfg. Co. 32

Johns-Manville Corp. 101

Keuffel & Esser Co. 74
Kinnear Mfg. Co. 112
Koppers Co., Inc. 44

Layne & Bowler Pump Co. 10
Le Roi Co. 30, 31
Le Tourneau-Westinghouse Co. 60-65
Liberty Mutual Ins. Co. 82, 83
Lock Joint Pipe Co. 18
Louisville Cement Co. 114

Mahon Co., R. C. 84
Maxon Construction Co. 104
McGraw-Hill Book Co. 90
McKiernan-Terry Corp. 100
McKinney Drilling Co. 100
Morse-Starrett Prod. Co. 103

National Clay Pipe Mfg. Inc. 91
National Steel Corp. (Stran Steel Div.) 94, 95
National Tube Div., U. S. Steel Corp. 119

Olin Aluminum Div., Olin Mathieson Chem. Corp. 49

Patent Scaffolding Co. 71
Peele Co. 117
Perlite Institute 106

Raymond Concrete Pile Co. 109
Reda Pump 103
Remington Arms Co., Inc. 89
R. B. P. 116
Republic Steel Corp. 46, 47
Russell, Burdsall & Ward Bolt & Nut Co. 87

St. Paul & Tacoma Lumber Co. 113
Sauereisen Cements Co. 100
Sauerman Bros., Inc. 54
Schramm, Inc. 80
Spencer, White & Prentis, Inc. 115
Stang Corp., John W. 75
Stow Mfg. Co. 77
Superior Concrete Accessories 55

Timber Engineering Co. 8
Timken Roller Bearing Co. ..... 4th Cover
Torrington 50
Travelers Insurance 110

Underpinning & Foundation Co. 102
Unit Crane & Shovel Corp. 120
U. S. Rubber Co. 22
U. S. Steel Supply Div. 11
U. S. Steel Corp. 53
United Steel Fabricators, Inc. 73
Universal Atlas Cement Co. 29
Universal Manufacturing Co. 116
Universal Sewer Pipe Corp. 3

Vari-Typer Co. 58

Westinghouse Electric Corp. 40, 41
Wild Heerbrugg Instruments, Inc. 112
Winpower Mfg. Co. 100
Wrought Washer Mfg. Co. 99

Yeomans Brothers Co. 16

Professional Services 131-134

CLASSIFIED ADVERTISING

F. J. Eberle, Business Mgr.

Employment Opportunities 124-128
Educational 128
Notices
Proposal 122-123
Equipment
(Used or Surplus New)
For Rent, Sales Wanted 128-130, 134

ENGINEERING NEWS-RECORD

330 West 42 St., New York 36—LOngacre 4-3000

ABP Member

Number of copies of this issue printed 77,701

D. S. ROBERTSON, Advertising Manager
D. J. CASSIDY, Business Manager

ADVERTISING REPRESENTATIVES

New York 2—500 5th Ave.
C. D. Neulen, H. T. Olsen
J. C. White

Chicago, 11—520 No. Michigan Ave.,
L. H. Hunt, W. G. Payne
J. A. Shipley

San Francisco, 4—68 Post St.,
J. W. Otterson, R. C. Alcorn

Philadelphia, 3—17th and Sansome Sts.,
D. G. Jensen, D. L. Kates

Cleveland, 15—Hanna Bldg.,
F. P. DiToro, E. B. Mingle Jr.

Detroit, 28—Penobscot Bldg.,
J. A. Houghton

St. Louis, 8—Continental Bldg.,
B. F. Horn

Los Angeles, 17—1125 W. Sixth St.,
H. L. Keeler

Atlanta, 3—Rhodes-Haverty Bldg.,
D. C. Billian

Dallas, 1—Vaughn Bldg., 1712 Commerce St.,
E. E. Schirmer

Pittsburgh, 22—1111 Oliver Bldg.
M. Russell

OTHER SALES OFFICES:

Boston, 16—350 Park Square Bldg.,
London, McGraw-Hill House

New EASTERN CAR SHAKERS

Bulk materials shipped in hopper bottoms and other open top railroad cars are unloaded easily with the aid of EASTERN'S new Car Shaker. Utilizing both impact and vibration, this new product incorporates the best features of earlier models to produce a more efficient operation. Its practical design and rugged construction have made it simple to operate and economical to use.

Write for Bulletin 50

EASTERN CONSTRUCTORS, INC.
Poland, Ohio

Editorials

India Modernizes Dambuilding

WERE AN ANNOUNCEMENT TO BE MADE that "India abandoned neutralism," it would receive worldwide attention. Yet that eight-year-old nation has made a choice quite as momentous—and politically more difficult—than the neutralism question. The decision is this: To abandon primitive methods of dambuilding in favor of modern mechanized construction.

While not one in 10,000 Indians ever heard of neutralism, each, down to the lowliest, was familiar with dambuilding and, what is most important, associated it with jobs. Unfortunately—and this is where the political difficulty centers—the only jobs which could be visualized were those connected with the actual construction of the dams by hand-labor methods. The fact that the really significant jobs are those which follow when the dams are completed and the water in their reservoirs can be used for irrigation and power was virtually incomprehensible. Therefore, for the new government to state, as one of its first decrees, that dams would be built by modern construction machinery so that they would be completed sooner was considered to be an act of political suicide.

As a matter of fact, the Indian government did not make any such announcement. Instead, at first, it followed a path of appeasement by starting its new dams with hand-labor methods. One dam, Tungabadra, was actually completed in that manner, with 20,000 laborers placing 16 million pieces of masonry in the process. But gradually a change was instituted. Machinery was brought in on Bhakra Dam to supplement the hand labor, where it could readily be recognized as necessary since this was a concrete gravity section nearly 700 ft high. Then the small Damodar Valley dams were designed in earth and concrete, also requiring some modern construction equipment. Likewise the mighty Hiracud Dam, completed early this year as the country's first multi-purpose project, combined a reduced amount of hand labor with $5 million worth of U.S. construction equipment to furnish a demonstration that was widely publicized.

What may well be the final act in this transition occurred recently (ENR May 9, p. 76) when a $94.5 million contract was let to an Indian contractor—as distinct from the previous government force account jobs—for Rihand Dam, a 296 ft high concrete gravity structure 3,142 ft long. On this job, for the first time, mechanized construction will be accepted without question or hedging.

For turning this political and technological corner the Indian government officials deserve the bulk of the credit, but it is proper also to note the contribution made to this changed national attitude by several Americans and at least one Indian on the technical level. There is Harvey Slocum who, as directing manager on Bhakra Dam, has hammered away at every Indian official he met on the necessity of modern mechanized methods. There were F. O. Harper and the late L. F. Harza, who, as members of the Damodar Valley Consulting Board, with chief engineer A. M. Kamora, pushed the use of faster construction methods on their series of dams. And finally there is Thirumale Iyengar who first supervised the construction of Tungabadra in a manner to demonstrate the fastest possible tempo for hand construction and then provided a clinching contrast when, as chief engineer of Hiracud, he directed a mechanized construction job that was completed in a much shorter time.

As a result of the actions of these men and many more, Indian dambuilding has arrived on a plane commensurate with the needs of a nation whose future is based so importantly on this product of the constructor's art.

Moral: Don't Change Plans

IF ANYONE EVER DOUBTED the reality of highway officials' concern over sharply rising costs, he has only to look at the latest price tag on three major works planned for New York City.

The projects are two new suspension bridges—one over the East River the other over The Narrows which separate Staten Island from the rest of the city—and the second-decking of the George Washington Bridge.

Cost comparisons are startling. Early in 1955, the Port of New York Authority and the Triborough Bridge and Tunnel Authority estimated that the three structures, with approaches, would cost a total of $379 million.

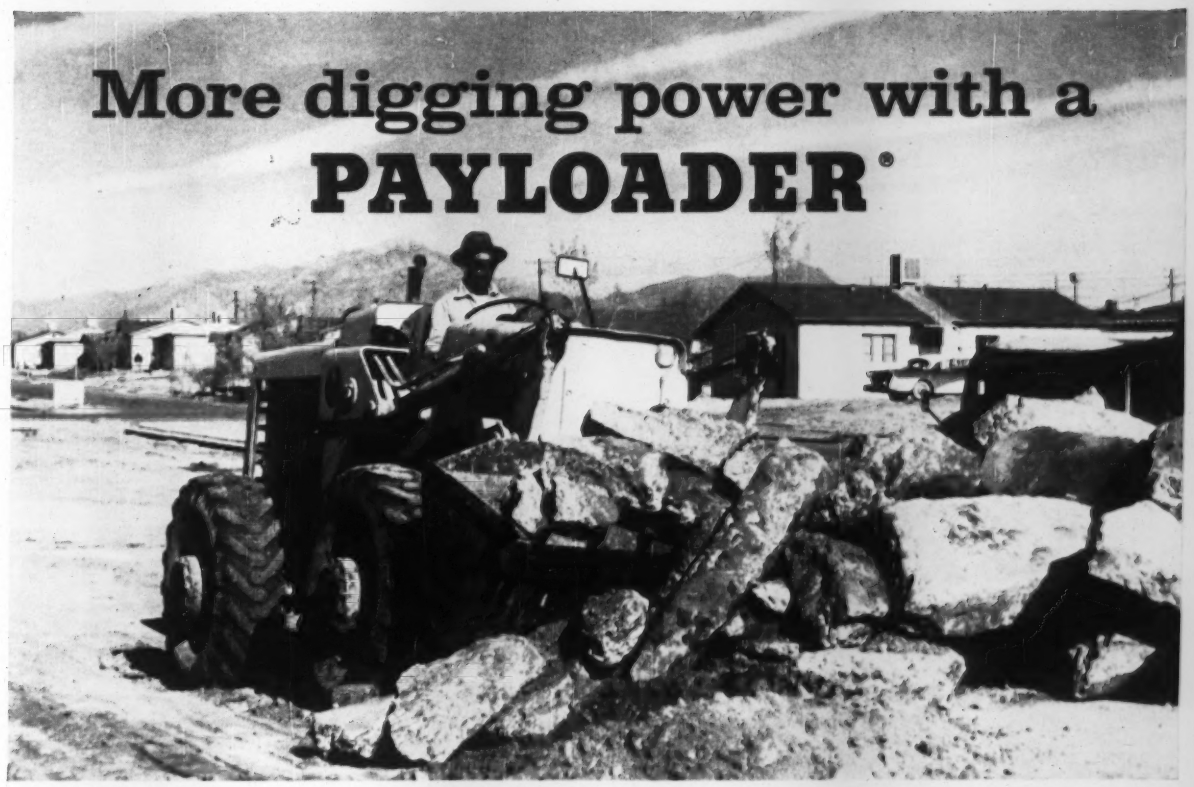
In mid-May of 1957, however, the two agencies put the total cost at $715 million.

The two sponsoring agencies point out that much of the huge jump in price is caused by the addition of the many extras insisted upon by local agencies as well as by private individuals. The New Jersey approach to the Washington Bridge, for example, has grown into a major expressway, numerous features have been added to the structures themselves as well as to their approaches. And of course, once approximate locations of the facilities was established, land values have skyrocketed, as have the costs and problems of relocation of tenants in the urban areas affected. And that's in addition to the general 12% rise in construction costs, and a much greater rise in such items as structural steel.

All of which points two morals that had best be kept in mind by all concerned, lest the national highway program fall short of its goals:

Make no small plans, and, having made them, stick to them—changes can be much too expensive; acquire right-of-way far enough in advance to halt speculation and sharply rising costs by the time the facility is ready for construction.

More digging power with a PAYLOADER®

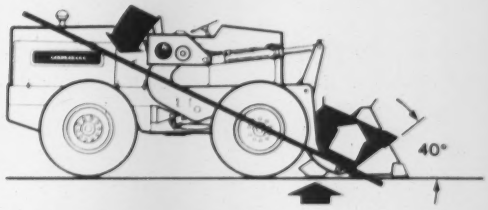


40° bucket roll-back at ground level plus powerful pry-out digging action

In EL PASO, TEXAS — preparing 7,755 feet of subgrade for a new, heavier roadway, Vowell Material Co. use their two "PAYLOADER" Models HO and HH to tear-up and truck-load the old pavement. Each loader keeps 2 and 3 trucks busy besides leveling the areas.

It takes *real digging power* to break-up and pry-out the 10-inch-thick concrete slabs . . . something like the exclusive *bucket action* on a "PAYLOADER" that combines powerful pry-out force with 40° bucket tip-back at ground level.

Add this superior digging power to the other outstanding performance features found in the new "PAYLOADER" models—hydraulic load-shock-absorber . . . power-transfer differentials . . . "no-stop" power-shift transmission . . . planetary final drives . . . power-steering and 4-wheel power brakes — and you'll know why a "PAYLOADER" digs-in and out-produces any wheeled tractor-shovel of comparable size. Your "PAYLOADER" Distributor is ready to prove this performance by having you *try one on your work*. Call him today.



Tremendous pry-out force — almost equal to the weight of the machine — can be exerted at the bucket digging edge by using the breakout pads on the bottom of the lifting arms as a ground support or fulcrum.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
772 Sunnyside Ave., Libertyville, Illinois
Send data on 4-wheel-drive "PAYLOADER" tractor-shovels as checked.

- ☐ Model HO (2¼-yd. payload, 1¾-yd. struck)
- ☐ Model HH (1¾-yd. payload, 1½-yd. struck)
- ☐ Model HU (1½-yd. payload, 1-yd. struck)

Name

Title

Company

Street

State

City

85

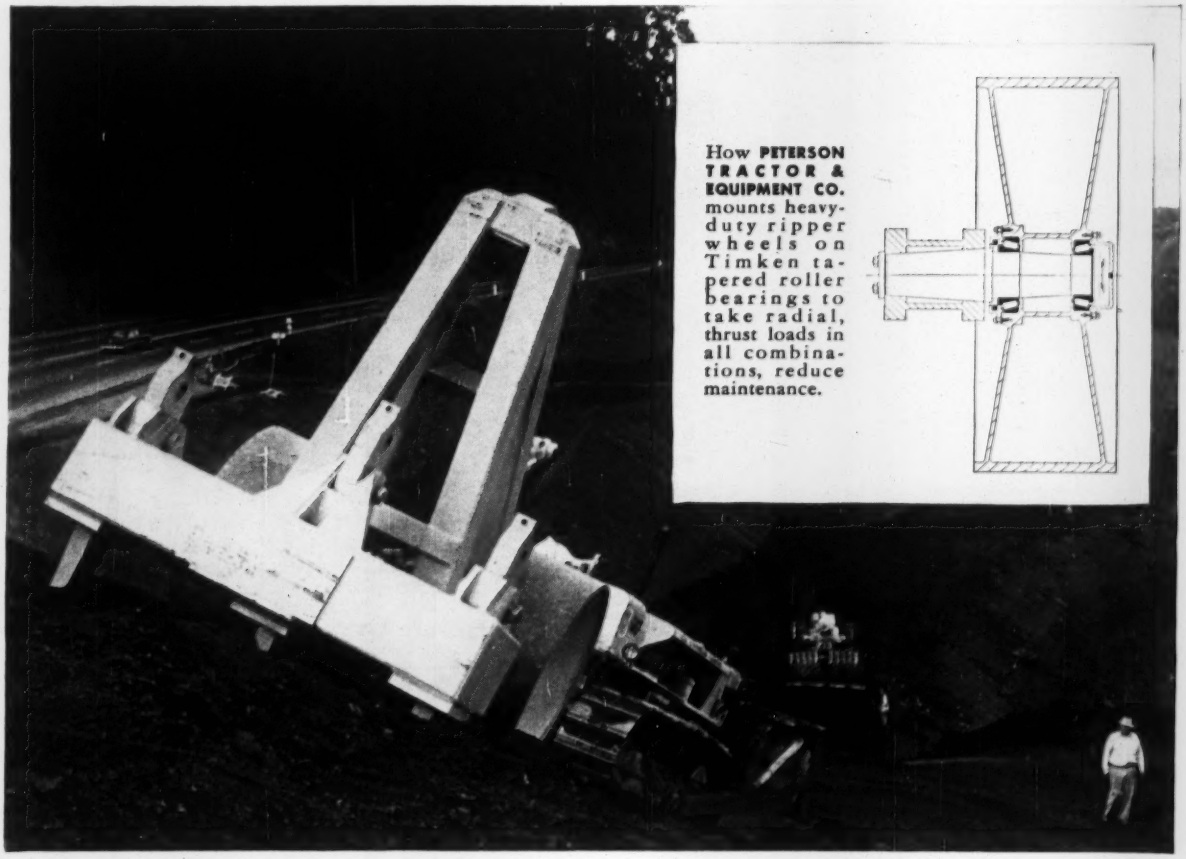
Largest, huskiest pull-type ripper ever made breaks solid rock—rides on TIMKEN® bearings

PETERSON Tractor & Equipment Company's 17-ton heavy-duty ripper does work formerly done by dynamite blast—rips dirt, shale, stone, soil, even solid rock strata, to depths up to 5 feet. Total weight of unit is about 35,000 lbs. From 1 to 6 tractors pull this ripper, depending on rockiness of soil. Steel drum wheels, 24″ wide x 60″ diameter, are mounted on Timken® tapered roller bearings.

Timken bearings, because of their tapered construction, can take radial and thrust loads in all combinations. Their geometric design gives true rolling motion, practically eliminates friction. Full line contact between rollers and races means extra load-carrying capacity. Every cup, cone, and roller is case-carburized, giving them hard, wear-resistant surfaces over tough, shock-resistant cores, to take heavy shock loads. By holding shafts and housings concentric, Timken bearings make closures more effective in keeping out dirt, dust, water, keeping lubricant in.

Timken bearings are precision-made, with quality controlled all the way from melt shop to final bearing inspection. We even make our own steel, something which no other American bearing manufacturer does. So . . . when you build or buy construction equipment, look for the trade-mark "TIMKEN" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **PETERSON TRACTOR & EQUIPMENT CO.** mounts heavy-duty ripper wheels on Timken tapered roller bearings to take radial, thrust loads in all combinations, reduce maintenance.

TIMKEN *TAPERED ROLLER BEARINGS ROLL THE LOAD*

TRADE-MARK REG. U. S. PAT. OFF.